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ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-3) LAUNCH

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16. ABSTRACT This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-3 launch time on March 22, 1982, at Kennedy Space Center, Florida. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch Jimsphere measured vertical wind profiles is given in this report. Also presented are the wind and thermodynamic parameters measured at the surface and aloft in the SRB descent/impact ocean area. Final meteorological tapes, which consist of wind and thermodynamic parameters versus altitude, for STS-3 vehicle ascent and SRB descent have been constructed. The STS-3 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 989-13-22-368 with Johnson Space Center.			
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TECHNICAL MEMORANDUM

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-3) LAUNCH

I. INTRODUCTION

This report presents an evaluation of the atmospheric environmental data taken during the launch of the Space Shuttle/STS-3 vehicle. This Space Shuttle vehicle was launched from Pad 39A at Kennedy Space Center (KSC), Florida, on a bearing of 60 degrees east of north at 1600 GMT (1100 EST) on March 22, 1982.

This report presents a summary of the atmospheric environment at launch time (L+0) of the STS-3, together with the sequence of prelaunch Jimsphere measured winds aloft profiles from L-14 h through liftoff. The general weather situation for the launch and flight area is described, and surface and upper level wind/thermodynamic observations near launch time are given. Surface and upper level wind/thermodynamic parameter measurements are also presented for the SRB descent/impact analyses.

Previous MSFC-related launch vehicle atmospheric environmental conditions have been published as Appendix A of individual MSFC Saturn Flight Evaluation Working Group reports [1]. Office memorandums have been issued for previous flights giving launch pad wind information. A report has also been published [2] which summarizes most launch atmospheric conditions observed for the past 155 MSFC/ABMA-related vehicle launches through SA-208 (Skylab 4). Reports summarizing ASTP, STS-1, and STS-2 launch conditions are presented in References 3, 4, and 5, respectively.

II. SOURCES OF DATA

Atmospheric observational data used in this report were taken from weather maps made by the National Weather Service, plus all available surface observations and measurements from around the launch area. Upper air observations were taken from balloon-released instruments sent aloft from Cape Canaveral Air Force Station (CCAFS) and from the ship Gen. H. S. Vandenberg in the Atlantic Ocean off the Florida Coast. High-altitude winds and thermodynamic data were measured by the Super Loki rocketsondes launched from the CCAFS. Table 1 presents a listing of systems used to obtain the upper level wind profiles used in compiling the final ascent meteorological data tape. Only the ship-launched Omegasonde-Rawinsonde and Super Loki rocket data were used in the upper level atmospheric regions for the construction of the final SRB descent/impact meteorological data tape. Data cutoff altitudes are also given in Table 1.

III. GENERAL SYNOPTIC SITUATION AT LAUNCH TIME

A high pressure ridge oriented west-northwest to east-southeast was pushing into the central United States during the morning of launch. A cold frontal system, preceding this eastward advancing, cooler air mass was located off the Atlantic coast, out of a low-pressure system near Maine. This front extended southward through Jacksonville, Florida, to become a stationary front in the Gulf of Mexico. Surface winds in the KSC area were light (7 to 8 ft/s) from the west, with humid conditions and warm temperatures (low 70's°F) being experienced throughout the early morning countdown. Figure 1 gives the surface weather map 4 hr prior to launch. Figure 2 presents the wind flow aloft at the 500 mb level. West-southwesterly to westerly winds dominated the flow aloft over the KSC area.

Cloud bands were located over, and in the ocean area east of, the KSC launch complex as shown in Figure 3. Figure 3 presents the GOES east (SMS II) visible satellite picture taken an hour and one half after launch (1730 GMT). Scattered stratocumulus clouds at 1800 ft, along with some scattered cirrus at 30,000 ft, were present during launch. Figure 4 shows the contrail of the Shuttle at launch as recorded by the GOES east satellites visible photograph taken at 1600 GMT.

IV. SURFACE OBSERVATIONS AT LAUNCH TIME

Surface observations at launch time for selected KSC locations are given in Table 2. Included are pad 39A, Shuttle runway, and CCAFS balloon release station observations. Neither precipitation nor lightning was observed at launch time.

Table 3 presents Pad 39A wind data along with other standard hourly meteorological measurements and sky observations for the 6 hr prior to launch of STS-3. Values for wind speed and direction are given for the 84 m (275 ft) FSS reference level and 18 m (60 ft) pad light pole level.

V. UPPER AIR MEASUREMENTS DURING LAUNCH

The FPS-16 Jimsphere (1618 GMT), GMD rawinsonde (1603 GMT), Loki-Dart rocketsonde (1934 GMT), and Super-Loki rocketsonde (1730 GMT) systems were used to measure the upper level wind and thermodynamic parameters for STS-3 launch. At altitudes above the rocket-measured data, the Global Reference Atmosphere (GRA) [6] parameters for March KSC conditions were used. A tabulation of the STS-3 final meteorological data for ascent is presented in Table 4 which lists the wind and thermodynamic parameters versus altitude. A brief summary of parameters is given in the following paragraphs.

A. Wind Speed

At launch time, wind speeds were 7.0 ft/s (4.1 kn) at 60 ft and increasing to a maximum of 119 ft/s (70.5 kn) blowing from 250 degrees. This maximum occurred at an altitude of 45,000 ft (13,716 m). The winds decreased above this level and then became stronger again at much higher levels, as shown in Figure 5. The overall maximum speed was 268 ft/s (158.7 kn) at 197,000 ft (60,046 m) altitude.

B. Wind Direction

At launch time, the 60 ft wind direction was from the northeast (50 degrees) and shifted to a westerly component above 2000 ft (610 m). Figure 5 shows the complete wind direction versus altitude profile. As shown in Figure 5, wind directions became quite variable at altitudes with low wind speeds.

Over the last 6 or more hours of the countdown, westerly surface (60 ft) winds prevailed at Pad 39A. However, just 7 min prior to launch (1053 EST), the late morning sea breeze entered the launch area and changed the wind direction toward an easterly component. By 1057 EST winds were from the northeast to east. Wind magnitudes also dropped slightly during this transition period of sea breeze establishment. The 60 ft wind directional plot, just prior to until just after STS-3 launch, is shown in Figure 6. The sea-breeze effect of wind directional shift just prior to launch is easily observable in this figure.

C. Prelaunch/Launch Wind Profiles

All wind profiles, except the L-1.75 hr, shown in Figures 7 through 10 were measured by the Jimsphere FPS-16 system. The L-1.75 hr profile was measured by the MSS-windsonde.

Wind speeds, although lighter than normal throughout the period, approached March mean values at launch time.

D. Thermodynamic Data

The thermodynamic data taken at STS-3 launch time, consisting of atmospheric temperature, dew-point temperature, pressure, and density have been compiled as the STS-3 ascent meteorological data and are presented in Table 4. The associated thermodynamic data taken in support of the SRB descent have also been assembled as the STS-3 SRB descent/impact meteorological data and are presented in Table 5. The vertical structure of temperature for the STS-3 ascent and for the SRB descent is shown graphically versus altitude in Figure 11.

The atmospheric thermodynamic parameters of temperature, pressure, and density, measured during STS-3 launch below 140,000 ft, were all close to their respective PRA-63 [7] annual values. Temperature deviated only a maximum of -2.8 percent from the PRA-63 at 63,000 ft (19,200 m). Pressure deviated a maximum of -1.3 percent from the PRA-63 at 97,000 ft (29,566 m), while density deviated 2.6 percent at 63,000 ft (19,202 m).

E. SRB Upper Air and Surface Measurements

As has been mentioned in earlier paragraphs, an SRB descent meteorological data tape has also been constructed which consists of data taken from the Omega-sonde-Rawinsonde system (1630 GMT) aboard the USNS Vandenberg, which was stationed off the coast in the Atlantic Ocean. The CCAFS measured Super-Loki Rocket-sonde data and the GRA model data were used at altitude levels above the measured Omegasonde data. The tabular values for the SRB descent meteorological tape are presented in Table 5, with wind speed and direction profiles presented in Figure 12. Figure 11 gives the vertical temperature profile.

The surface-ship meteorological and oceanographical observations taken close to STS-3 SRB impact are presented in Table 6.

VI. ATMOSPHERIC SUMMARY CONDITIONS FOR STS LAUNCHES

Given in Table 7 are selected atmospheric L+0 launch conditions for all the Space Shuttle launches.

TABLE 1. SYSTEMS USED TO MEASURE UPPER AIR WIND DATA FOR STS-3 ASCENT*

Type of Data	Date: March 22, 1982		Portion of Data Used			
	Release Time		Start		End	
	Time (UT) (h:min)	Time After T+0 (min)	Altitude m (ft)	Time After T+0 (min)	Altitude m (ft)	Time After T+0 (min)
FPS-16 Jimsphere	16:18	18	6 (21)	18	17,374 (57,000)	77
Rawinsonde	16:03	3	17,678 (58,000)	61	29,566 (97,000)	100
Loki-Dart Rocketsonde	19:34	214	69,494 (228,000)	214	29,870 (98,000)	230
Super-Loki Rocketsonde (Robin)	17:30	90	78,943 (259,000)	90	69,799 (229,000)	91
Omegasonde-Rawinsonde*	16:30	30	18 (60)	30	29,261 (96,000)	126

*The Omegasonde-Rawinsonde was released from the USNS Gen. H.S. Vandenberg to measure the upper atmosphere for SRB descent/impact analyses.

TABLE 2. SURFACE OBSERVATIONS AT STS-3 LAUNCH TIME

Location ^a	Time After L+0 (min)	Pressure (MSL) N/cm ² (psia)	Temperature °K (°F)	Dew Point °K (°F)	Relative Humidity (%)	Visibility km (miles)	Sky Cover			Wind	
							Cloud*** Amount (Tenths)	Cloud Type	Height of Base Meters (ft)	Speed f/s (kn)	Direction (deg)
NASA Space Shuttle Runway Winds Measured at 10.4 m (34 ft)	0	10.166 (14.745)	299.8 (80.0)	292.0 (66.0)	66	16 (10)	4	Strato-Cumulus	549 (1,800)	3.4 (2.0)	250
CCAFS ^c Surface Measurements	3	10.163* (14.740)	299.3 (79.0)	292.5 (67.0)	66	-	-	-	-	5.0 (3.0)	240
Pad 39A lightpole ^d NW 18.3 m (60.0 ft)	0	10.160** (14.736)	297.6 (76.0)	292.0 (66.0)	71	-	-	-	-	7.0 ^b (4.1)	50 ^b
Pad 39A FSS (Top-NW) 83.8 m (275 ft)	0	-	-	-	-	-	-	-	-	8.0 ^b (4.7)	145 ^b

* Pressure value at 13 ft above MSL.

** Pad 39A Camera Site 3 barometric pressure instrument appeared to be reading too low. Therefore, the KSC Shuttle runway station pressure value interpolated to 10.160 N/cm² at 21 ft above MSL would be more appropriate as the L+0 pad atmospheric pressure measurement.

*** 5/10 total sky cover.

a. Altitudes of measurements are above natural grade, except where noted.

b. 10 sec average prior to L+0.

c. Balloon release site.

d. Pad 39A thermodynamic measurements are taken at camera site #3, 6.4 m (21 ft) above MSL.

TABLE 3. STS-3 PRE-LAUNCH THROUGH LAUNCH KSC PAD 39A
METEOROLOGICAL MEASUREMENTS *

Hourly Atmospheric Measurements										Sky Condition		
22 March 1982 Time Z	Temp. (°F)	Dew Pt. (°F)	RH (%)	275' Level (SE)**		60' Level (NW)**		Clouds	Total Sky Cover	Vis. (mi.)	Other Remarks	
				WS Kt	WD°	WS Kt	WD°					
0900	69	67	94	10	250	4	220	2/10 SC at 3,000 ft	2/10	10	Patches shallow ground fog Patches ground fog	
1000	69	68	98	12	260	5	290	7/10 SC at 1,200 ft	7/10	8		
1100	68	68	100	15	240	5	220	7/10 SC at 1,200 ft	7/10	8		
1200	68	68	100	14	250	5	230	8/10 SC at 1,200 ft	8/10	8		
1300	70	70	100	13	250	5	260	1/10 CU at 600 ft 8/10 SC at 1,400 ft 6/10 Ci at 30,000 ft	8/10	7		
1400	73	73	100	17	250	8	260	3/10 SC at 1,600 ft 1/10 Ci at 30,000 ft	4/10	8		
1500	74	68	81	14	250	7	260	8/10 SC at 1,400 ft 1/10 Ci at 30,000 ft	8/10	10		
L+0***1600	76	66	71	5	145	4	50	4/10 SC at 1,800 ft 1/10 Ci at 30,000 ft	5/10	10		

* Hourly observations obtained verbally from CCAFS.

** 10 min mean about the hour from pad 39A instrumentation.

*** L+0 PAD Wind and thermodynamic parameters obtained from KSC strip charts. NW Anemometers used at 60 and 275 ft levels for L+0 wind conditions (~ 10 sec average prior to L+0). PAD 39A L+0 atmospheric pressure, at 21 ft (MSL), was 10.160 N/cm². Sea level pressure was 10.166 N/cm².

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TABLE 4. STS-3 FINAL T+0 ASCENT METEOROLOGICAL DATA TAPE

METEOROLOGICAL DATA TAPE	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
000021	005	085	28.4	.1016+04	.1180+04	18.8
000100	007	080	24.1	.1013+04	.1178+04	18.7
000200	008	110	23.7	.1010+04	.1175+04	18.6
000300	006	195	23.3	.1006+04	.1173+04	18.5
000400	003	283	23.0	.1003+04	.1170+04	18.4
000500	001	346	22.6	.9993+03	.1168+04	18.3
000600	001	239	22.2	.9958+03	.1165+04	18.1
000700	004	093	21.8	.9924+03	.1163+04	18.0
000800	007	275	21.5	.9889+03	.1160+04	17.9
000900	004	303	21.1	.9855+03	.1158+04	17.8
001000	003	329	20.7	.9821+03	.1155+04	17.7
001100	005	299	20.4	.9786+03	.1152+04	17.6
001200	008	281	20.2	.9752+03	.1149+04	17.6
001300	009	285	19.9	.9718+03	.1146+04	17.5
001400	010	283	19.6	.9683+03	.1143+04	17.4
001500	007	279	19.4	.9649+03	.1140+04	17.3
001600	017	301	19.1	.9615+03	.1137+04	17.3
001700	008	305	18.8	.9582+03	.1134+04	17.2
001800	008	300	18.5	.9548+03	.1131+04	17.1
001900	007	282	18.3	.9514+03	.1129+04	17.1
002000	012	280	18.0	.9481+03	.1126+04	17.0
002100	012	272	17.8	.9447+03	.1123+04	16.5
002200	010	258	17.7	.9414+03	.1119+04	16.0
002300	010	262	17.5	.9380+03	.1116+04	15.6
002400	007	208	17.3	.9347+03	.1113+04	15.1
002500	013	233	17.2	.9314+03	.1110+04	14.6
002600	002	284	17.0	.9281+03	.1107+04	14.1
002700	008	270	16.8	.9248+03	.1104+04	13.6
002800	010	217	16.6	.9215+03	.1101+04	13.2
002900	013	262	16.5	.9182+03	.1098+04	12.7
003000	016	260	16.3	.9150+03	.1095+04	12.2
003100	017	259	16.3	.9117+03	.1091+04	11.4
003200	018	260	16.2	.9084+03	.1088+04	10.7
003300	019	259	16.2	.9052+03	.1084+04	9.9
003400	019	258	16.1	.9020+03	.1081+04	9.2
003500	020	259	16.1	.8988+03	.1077+04	8.4
003600	021	251	16.1	.8956+03	.1074+04	7.6
003700	022	260	16.0	.8924+03	.1070+04	6.9
003800	025	259	16.0	.8892+03	.1067+04	6.1
003900	027	257	15.9	.8860+03	.1064+04	5.4
004000	029	256	15.9	.8828+03	.1060+04	4.6
004100	029	256	15.6	.8797+03	.1057+04	4.6
004200	028	256	15.4	.8765+03	.1054+04	4.6
004300	029	255	15.1	.8734+03	.1052+04	4.6
004400	029	253	14.8	.8702+03	.1049+04	4.6
004500	029	252	14.6	.8671+03	.1046+04	4.6
004600	029	251	14.3	.8640+03	.1043+04	4.7
004700	029	248	14.0	.8609+03	.1040+04	4.7
004800	029	250	13.7	.8578+03	.1038+04	4.7
004900	028	249	13.5	.8547+03	.1035+04	4.7

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TABLE 4. (Continued)

OFF NUMBER	LAUNCH DATE	LAUNCH TIME	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/CM ³)	DEW POINT (DEG C)
005100	020322	021	026	252	12.9	.8486+03	.1032+04	4.6	4.7
005200	026	252	026	252	12.6	.8455+03	.1027+04	4.5	4.4
005300	026	252	026	254	11.9	.8424+03	.1024+04	4.4	4.3
005400	026	254	026	254	11.6	.8394+03	.1022+04	4.2	4.0
005500	026	254	026	254	11.3	.8363+03	.1019+04	3.9	3.8
005600	026	254	026	254	11.0	.8331+03	.1017+04	3.7	3.6
005700	026	254	026	254	10.6	.8303+03	.1014+04	2.8	1.9
005800	026	254	026	254	10.3	.8272+03	.1012+04	1.1	.2
005900	026	254	026	254	9.9	.8242+03	.1009+04	-6	-1.5
006000	026	254	026	254	9.5	.8213+03	.1007+04	-2.3	-3.2
006100	026	254	026	254	9.1	.8183+03	.1004+04	-4.9	-5.9
006200	026	254	026	254	8.7	.8153+03	.1001+04	-6.9	-7.8
006300	026	254	026	254	8.3	.8123+03	.9983+03	-8.8	-9.8
006400	026	254	026	254	8.0	.8093+03	.9955+03	-10.8	-11.8
006500	026	254	026	254	7.7	.8063+03	.9927+03	-12.7	-13.7
006600	026	254	026	254	7.4	.8034+03	.9898+03	-14.7	-15.7
006700	026	254	026	254	7.1	.8004+03	.9870+03	-16.6	-17.6
006800	026	254	026	254	6.8	.7975+03	.9842+03	-18.5	-19.5
006900	026	254	026	254	6.5	.7946+03	.9814+03	-20.4	-21.4
007000	026	254	026	254	6.2	.7917+03	.9786+03	-22.3	-23.3
007100	026	254	026	254	5.9	.7888+03	.9757+03	-24.2	-25.2
007200	026	254	026	254	5.6	.7859+03	.9728+03	-26.1	-27.1
007300	026	254	026	254	5.3	.7830+03	.9699+03	-28.0	-29.0
007400	026	254	026	254	5.0	.7801+03	.9670+03	-30.0	-31.0
007500	026	254	026	254	4.7	.7772+03	.9641+03	-31.9	-32.9
007600	026	254	026	254	4.4	.7743+03	.9612+03	-33.8	-34.8
007700	026	254	026	254	4.1	.7714+03	.9583+03	-35.7	-36.7
007800	026	254	026	254	3.8	.7685+03	.9554+03	-37.6	-38.6
007900	026	254	026	254	3.5	.7656+03	.9525+03	-39.5	-40.5
008000	026	254	026	254	3.2	.7627+03	.9496+03	-41.4	-42.4
008100	026	254	026	254	2.9	.7598+03	.9467+03	-43.3	-44.3
008200	026	254	026	254	2.6	.7569+03	.9438+03	-45.2	-46.2
008300	026	254	026	254	2.3	.7540+03	.9409+03	-47.1	-48.1
008400	026	254	026	254	2.0	.7511+03	.9380+03	-49.0	-50.0
008500	026	254	026	254	1.7	.7482+03	.9351+03	-50.9	-51.9
008600	026	254	026	254	1.4	.7453+03	.9322+03	-52.8	-53.8
008700	026	254	026	254	1.1	.7424+03	.9293+03	-54.7	-55.7
008800	026	254	026	254	0.8	.7395+03	.9264+03	-56.6	-57.6
008900	026	254	026	254	0.5	.7366+03	.9235+03	-58.5	-59.5
009000	026	254	026	254	0.2	.7337+03	.9206+03	-60.4	-61.4
009100	026	254	026	254	0.0	.7308+03	.9177+03	-62.3	-63.3
009200	026	254	026	254	0.0	.7279+03	.9148+03	-64.2	-65.2
009300	026	254	026	254	0.0	.7250+03	.9119+03	-66.1	-67.1
009400	026	254	026	254	0.0	.7221+03	.9090+03	-68.0	-69.0
009500	026	254	026	254	0.0	.7192+03	.9061+03	-69.9	-70.9
009600	026	254	026	254	0.0	.7163+03	.9032+03	-71.8	-72.8
009700	026	254	026	254	0.0	.7134+03	.9003+03	-73.7	-74.7
009800	026	254	026	254	0.0	.7105+03	.8974+03	-75.6	-76.6
009900	026	254	026	254	0.0	.7076+03	.8945+03	-77.5	-78.5

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

OFT NUMBER	LAUNCH DATE	3	METEOROLOGICAL DATA TAPE	WIND SPEED	WIND DIRECTION	TEMPERATURE	PRESSURE	DENSITY	DEW POINT
ALTITUDE				(FT/SEC)	(DEG)	(DEG C)	(MILLIBARS)	(GRAM/M3)	(DEG C)
010100	010100	031	261	9.2	7066+03	7092+03	8712+03	-16.3	
010100	010100	032	261	8.9	7066+03	7092+03	8718+03	-16.3	
010200	010200	032	258	8.7	7040+03	7092+03	8693+03	-16.4	
010300	010300	031	257	8.4	7014+03	7092+03	8669+03	-16.6	
010400	010400	032	256	8.2	6988+03	7092+03	8645+03	-16.8	
010500	010500	036	252	7.9	6962+03	7092+03	8621+03	-16.9	
010600	010600	036	252	7.7	6937+03	7092+03	8597+03	-17.1	
010700	010700	036	252	7.4	6911+03	7092+03	8573+03	-17.3	
010800	010800	036	249	7.2	6886+03	7092+03	8549+03	-17.5	
010900	010900	037	247	6.9	6860+03	7092+03	8525+03	-17.6	
011000	011000	036	247	6.7	6835+03	7092+03	8501+03	-17.8	
011100	011100	039	243	6.5	6810+03	7092+03	8477+03	-18.0	
011200	011200	042	241	6.2	6784+03	7092+03	8452+03	-18.1	
011300	011300	042	240	6.0	6759+03	7092+03	8428+03	-18.3	
011400	011400	043	239	5.8	6734+03	7092+03	8404+03	-18.5	
011500	011500	045	237	5.6	6709+03	7092+03	8379+03	-18.6	
011600	011600	044	236	5.3	6684+03	7092+03	8355+03	-18.8	
011700	011700	044	235	5.1	6659+03	7092+03	8331+03	-19.0	
011800	011800	046	234	4.9	6635+03	7092+03	8307+03	-19.2	
011900	011900	045	234	4.6	6610+03	7092+03	8283+03	-19.3	
012000	012000	047	233	4.4	6585+03	7092+03	8259+03	-19.5	
012100	012100	047	232	4.2	6561+03	7092+03	8233+03	-19.6	
012200	012200	050	230	4.1	6536+03	7092+03	8207+03	-19.7	
012300	012300	050	230	3.9	6512+03	7092+03	8181+03	-19.9	
012400	012400	050	227	3.8	6487+03	7092+03	8154+03	-20.0	
012500	012500	052	227	3.6	6463+03	7092+03	8128+03	-20.1	
012600	012600	051	228	3.5	6439+03	7092+03	8102+03	-20.2	
012700	012700	050	231	3.4	6415+03	7092+03	8076+03	-20.3	
012800	012800	049	234	3.2	6391+03	7092+03	8051+03	-20.5	
012900	012900	048	237	3.1	6367+03	7092+03	8025+03	-20.6	
013000	013000	045	234	2.9	6343+03	7092+03	7999+03	-20.7	
013100	013100	044	237	2.7	6319+03	7092+03	7974+03	-20.8	
013200	013200	041	239	2.6	6296+03	7092+03	7949+03	-21.0	
013300	013300	038	240	2.4	6272+03	7092+03	7923+03	-21.1	
013400	013400	036	241	2.3	6248+03	7092+03	7898+03	-21.3	
013500	013500	033	240	2.1	6225+03	7092+03	7873+03	-21.4	
013600	013600	032	236	1.9	6201+03	7092+03	7848+03	-21.5	
013700	013700	032	236	1.8	6178+03	7092+03	7823+03	-21.7	
013800	013800	032	234	1.6	6155+03	7092+03	7798+03	-21.8	
013900	013900	032	235	1.5	6132+03	7092+03	7774+03	-22.0	
014000	014000	033	234	1.3	6109+03	7092+03	7749+03	-22.1	
014100	014100	034	236	1.1	6086+03	7092+03	7725+03	-22.3	
014200	014200	035	235	.9	6063+03	7092+03	7702+03	-22.4	
014300	014300	037	237	.7	6040+03	7092+03	7678+03	-22.6	
014400	014400	039	237	.5	6017+03	7092+03	7655+03	-22.8	
014500	014500	039	237	.3	5994+03	7092+03	7632+03	-22.9	
014600	014600	038	238	.1	5971+03	7092+03	7608+03	-23.1	
014700	014700	039	237	-.1	5948+03	7092+03	7585+03	-23.3	
014800	014800	038	239	-.3	5926+03	7092+03	7562+03	-23.5	
014900	014900	040	238	-.5	5904+03	7092+03	7539+03	-23.6	

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

OFF NUMBER	LAUNCH DATE	LAUNCH TIME	ALTIMETER	WIND SPEED	WIND DIRECTION	TEMPERATURE	PRESSURE	DENSITY	DEW POINT
(FT)	(MM/DD/YY)	(MM/DD/YY)	(FT)	(FT/SEC)	(DEG)	(DEG C)	(MILLIBARS)	(GRAM/M3)	(DEG C)
015000	043	230	043	043	230	-7.9	.5081+03	.7516+03	-23.8
015100	043	240	043	043	240	-9.9	.5089+03	.7493+03	-23.9
015200	044	243	044	044	243	-1.1	.5037+03	.7409+03	-24.1
015300	045	244	045	045	244	-1.3	.5014+03	.7446+03	-24.2
015400	046	244	046	046	244	-1.5	.5792+03	.7423+03	-24.4
015500	045	244	045	045	244	-1.6	.5770+03	.7400+03	-24.5
015600	046	245	046	046	245	-1.8	.5748+03	.7377+03	-24.6
015700	046	247	046	046	247	-2.0	.5726+03	.7354+03	-24.8
015800	046	247	046	046	247	-2.2	.5704+03	.7331+03	-24.9
015900	048	247	048	048	247	-2.4	.5683+03	.7308+03	-25.1
016000	047	247	047	047	247	-2.6	.5661+03	.7285+03	-25.2
016100	048	245	048	048	245	-2.9	.5639+03	.7265+03	-25.4
016200	048	248	048	048	248	-3.1	.5617+03	.7244+03	-25.6
016300	050	243	050	050	243	-3.4	.5596+03	.7223+03	-25.8
016400	052	242	052	052	242	-3.7	.5574+03	.7203+03	-26.0
016500	052	242	052	052	242	-3.9	.5553+03	.7183+03	-26.2
016600	055	241	055	055	241	-4.2	.5532+03	.7162+03	-26.4
016700	057	242	057	057	242	-4.5	.5510+03	.7142+03	-26.6
016800	059	240	059	059	240	-4.8	.5489+03	.7122+03	-26.8
016900	061	241	061	061	241	-5.0	.5468+03	.7102+03	-27.0
017000	061	241	061	061	241	-5.3	.5447+03	.7081+03	-27.2
017100	062	239	062	062	239	-5.5	.5426+03	.7059+03	-27.4
017200	062	240	062	062	240	-5.7	.5405+03	.7036+03	-27.5
017300	062	239	062	062	239	-5.8	.5384+03	.7014+03	-27.7
017400	062	239	062	062	239	-6.0	.5363+03	.6991+03	-27.8
017500	063	240	063	063	240	-6.2	.5342+03	.6969+03	-28.0
017600	064	239	064	064	239	-6.4	.5322+03	.6947+03	-28.2
017700	065	240	065	065	240	-6.6	.5301+03	.6924+03	-28.3
017800	068	239	068	068	239	-6.7	.5281+03	.6902+03	-28.5
017900	069	241	069	069	241	-6.9	.5260+03	.6880+03	-28.6
018000	069	240	069	069	240	-7.1	.5240+03	.6858+03	-28.8
018100	068	240	068	068	240	-7.3	.5219+03	.6834+03	-29.0
018200	067	241	067	067	241	-7.6	.5199+03	.6817+03	-29.1
018300	067	241	067	067	241	-7.8	.5178+03	.6797+03	-29.3
018400	065	241	065	065	241	-8.1	.5158+03	.6777+03	-29.5
018500	065	241	065	065	241	-8.3	.5138+03	.6757+03	-29.6
018600	064	244	064	064	244	-8.6	.5118+03	.6737+03	-29.8
018700	064	244	064	064	244	-8.8	.5098+03	.6717+03	-30.0
018800	065	244	065	065	244	-9.1	.5078+03	.6697+03	-30.2
018900	066	245	066	066	245	-9.3	.5058+03	.6677+03	-30.3
019000	066	243	066	066	243	-9.6	.5038+03	.6658+03	-30.5
019100	067	244	067	067	244	-9.8	.5019+03	.6638+03	-30.7
019200	066	248	066	066	248	-10.1	.4999+03	.6618+03	-30.8
019300	066	243	066	066	243	-10.3	.4979+03	.6599+03	-31.0
019400	066	244	066	066	244	-10.6	.4959+03	.6578+03	-31.2
019500	067	242	067	067	242	-10.8	.4940+03	.6558+03	-31.3
019600	067	242	067	067	242	-11.1	.4920+03	.6539+03	-31.5
019700	067	240	067	067	240	-11.3	.4901+03	.6519+03	-31.7
019800	067	240	067	067	240	-11.6	.4881+03	.6500+03	-31.9
019900	067	240	067	067	240	-11.6	.4862+03	.6480+03	-32.0

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

OF1 NUMEER 3								
LAUNCH DATE P20322								
METEOROLOGICAL DATA TAPE								
ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)		
020000	066	240	-12.1	.4881+03	.6461+03	-32.2		
020100	066	241	-12.3	.4874+03	.6441+03	-32.4		
020200	065	240	-12.6	.4805+03	.6421+03	-32.6		
020300	064	240	-12.8	.4785+03	.6402+03	-32.8		
020400	063	239	-13.1	.4766+03	.6382+03	-33.0		
020500	063	240	-13.3	.4747+03	.6363+03	-33.1		
020600	064	241	-13.5	.4728+03	.6343+03	-33.3		
020700	065	240	-13.8	.4710+03	.6324+03	-33.5		
020800	066	241	-14.0	.4691+03	.6305+03	-33.7		
020900	066	241	-14.3	.4672+03	.6285+03	-33.9		
021000	065	241	-14.5	.4654+03	.6266+03	-34.1		
021100	064	242	-14.8	.4635+03	.6248+03	-34.3		
021200	065	242	-15.1	.4616+03	.6230+03	-34.5		
021300	064	242	-15.4	.4598+03	.6212+03	-34.7		
021400	065	240	-15.7	.4579+03	.6194+03	-34.9		
021500	064	240	-15.9	.4561+03	.6176+03	-35.1		
021600	064	238	-16.2	.4542+03	.6158+03	-35.4		
021700	064	239	-16.5	.4524+03	.6140+03	-35.6		
021800	064	238	-16.8	.4506+03	.6122+03	-35.8		
021900	066	236	-17.1	.4488+03	.6105+03	-36.0		
022000	066	237	-17.4	.4470+03	.6087+03	-36.2		
022100	067	236	-17.6	.4452+03	.6068+03	-36.5		
022200	067	237	-17.9	.4434+03	.6049+03	-36.7		
022300	068	238	-18.1	.4415+03	.6029+03	-37.0		
022400	068	238	-18.3	.4398+03	.6010+03	-37.3		
022500	069	240	-18.5	.4380+03	.5991+03	-37.5		
022600	068	241	-18.8	.4362+03	.5972+03	-37.8		
022700	068	240	-19.0	.4344+03	.5954+03	-38.1		
022800	067	242	-19.2	.4326+03	.5935+03	-38.4		
022900	068	242	-19.5	.4309+03	.5916+03	-38.6		
023000	069	244	-19.7	.4291+03	.5897+03	-38.9		
023100	068	245	-20.0	.4274+03	.5880+03	-39.1		
023200	068	246	-20.3	.4256+03	.5862+03	-39.2		
023300	068	247	-20.5	.4239+03	.5845+03	-39.4		
023400	070	247	-20.8	.4221+03	.5827+03	-39.5		
023500	069	249	-21.1	.4204+03	.5810+03	-39.7		
023600	069	247	-21.4	.4187+03	.5792+03	-39.9		
023700	069	247	-21.7	.4170+03	.5775+03	-40.0		
023800	069	249	-21.9	.4153+03	.5758+03	-40.2		
023900	069	247	-22.2	.4136+03	.5740+03	-40.3		
024000	069	245	-22.5	.4119+03	.5723+03	-40.5		
024100	070	246	-22.8	.4102+03	.5706+03	-40.7		
024200	069	246	-23.0	.4084+03	.5688+03	-40.9		
024300	070	245	-23.3	.4068+03	.5670+03	-41.0		
024400	070	245	-23.5	.4051+03	.5652+03	-41.2		
024500	070	246	-23.8	.4034+03	.5635+03	-41.4		
024600	070	248	-24.1	.4017+03	.5617+03	-41.6		
024700	070	249	-24.3	.4000+03	.5600+03	-41.8		
024800	069	247	-24.6	.3984+03	.5582+03	-41.9		
024900	071	247	-24.8	.3967+03	.5565+03	-42.1		

TABLE 4. (Continued)

OFI NUMBER	LAUNCH DATE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG C)
3	122							
025100		426.00	071	249	-25.1	.3951+03	.5540+03	-42.3
025200		072	072	248	-25.3	.3934+03	.5529+03	-42.4
025300		075	075	249	-25.5	.3918+03	.5509+03	-42.5
025400		076	076	249	-25.6	.3901+03	.5490+03	-42.7
025500		076	076	249	-25.8	.3885+03	.5471+03	-42.8
025600		073	073	249	-26.0	.3869+03	.5453+03	-42.9
025700		072	072	251	-26.2	.3853+03	.5434+03	-43.0
025800		071	071	250	-26.4	.3836+03	.5415+03	-43.1
025900		070	070	250	-26.5	.3820+03	.5396+03	-43.3
026000		070	070	250	-26.7	.3804+03	.5377+03	-43.4
026100		069	069	250	-26.9	.3788+03	.5359+03	-43.5
026200		069	069	250	-27.1	.3773+03	.5340+03	-43.6
026300		070	070	250	-27.3	.3757+03	.5322+03	-43.7
026400		068	068	249	-27.4	.3741+03	.5303+03	-43.8
026500		068	068	249	-27.6	.3725+03	.5285+03	-43.9
026600		066	066	251	-27.8	.3709+03	.5266+03	-44.0
026700		067	067	250	-28.0	.3694+03	.5248+03	-44.2
026800		068	068	250	-28.2	.3678+03	.5230+03	-44.3
026900		069	069	252	-28.3	.3663+03	.5211+03	-44.4
027000		071	071	249	-28.5	.3647+03	.5193+03	-44.5
027100		072	072	250	-28.7	.3632+03	.5175+03	-44.6
027200		071	071	249	-28.9	.3616+03	.5158+03	-44.4
027300		071	071	249	-29.1	.3601+03	.5140+03	-44.2
027400		071	071	248	-29.4	.3586+03	.5123+03	-44.0
027500		071	071	249	-29.6	.3570+03	.5106+03	-43.8
027600		070	070	249	-29.8	.3555+03	.5089+03	-43.7
027700		070	070	249	-30.0	.3540+03	.5072+03	-43.5
027800		069	069	249	-30.2	.3525+03	.5055+03	-43.3
027900		069	069	251	-30.5	.3510+03	.5038+03	-43.1
028000		070	070	246	-30.7	.3495+03	.5021+03	-42.9
028100		069	069	247	-30.9	.3480+03	.5004+03	-42.7
028200		070	070	251	-31.2	.3465+03	.4989+03	-42.7
028300		071	071	248	-31.5	.3450+03	.4974+03	-42.7
028400		070	070	250	-31.8	.3436+03	.4959+03	-42.6
028500		070	070	249	-32.1	.3421+03	.4944+03	-42.6
028600		070	070	250	-32.4	.3406+03	.4929+03	-42.6
028700		068	068	251	-32.6	.3392+03	.4914+03	-42.6
028800		068	068	251	-33.1	.3377+03	.4900+03	-42.6
028900		072	072	251	-33.4	.3363+03	.4885+03	-42.5
029000		072	072	250	-33.7	.3348+03	.4870+03	-42.5
029100		073	073	251	-34.0	.3334+03	.4856+03	-42.5
029200		074	074	249	-34.2	.3319+03	.4839+03	-42.6
029300		074	074	251	-34.5	.3305+03	.4823+03	-42.8
029400		074	074	252	-34.7	.3290+03	.4808+03	-42.9
029500		074	074	250	-35.0	.3276+03	.4792+03	-43.1
029600		074	074	251	-35.2	.3262+03	.4776+03	-43.2
029700		075	075	252	-35.5	.3248+03	.4760+03	-43.3
029800		075	075	252	-35.7	.3234+03	.4744+03	-43.5
029900		077	077	255	-36.0	.3220+03	.4729+03	-43.6
030000		075	075	252	-36.2	.3206+03	.4713+03	-43.8

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

OFI NUMBER LAUNCH DATE 820122 METEOROLOGICAL DATA 1APF	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
	630000	076	255	-36.5	3192.03	4698.03	-43.9
	030100	077	255	-36.7	3178.03	4681.03	-44.1
	030200	075	255	-36.9	3164.03	4665.03	-44.3
	030300	074	254	-37.1	3150.03	4649.03	-44.4
	030400	073	254	-37.3	3136.03	4632.03	-44.6
	030500	074	255	-37.5	3122.03	4616.03	-44.8
	030600	073	254	-37.8	3109.03	4600.03	-45.0
	030700	071	255	-38.0	3095.03	4584.03	-45.2
	030800	071	257	-38.2	3081.03	4568.03	-45.3
	030900	071	258	-38.4	3068.03	4557.03	-45.5
	031000	072	258	-38.6	3054.03	4536.03	-45.7
	031100	072	258	-38.9	3041.03	4521.03	-45.9
	031200	072	259	-39.1	3027.03	4506.03	-46.2
	031300	072	260	-39.4	3014.03	4491.03	-46.4
	031400	073	260	-39.6	3001.03	4476.03	-46.6
	031500	073	260	-39.9	2987.03	4461.03	-46.8
	031600	074	261	-40.2	2974.03	4446.03	-47.1
	031700	074	261	-40.4	2961.03	4432.03	-47.3
	031800	075	261	-40.7	2948.03	4417.03	-47.5
	031900	074	263	-40.9	2935.03	4402.03	-47.8
	032000	076	259	-41.2	2922.03	4388.03	-48.0
	032100	075	261	-41.4	2909.03	4371.03	-48.2
	032200	078	261	-41.5	2896.03	4355.03	-48.4
	032300	080	261	-41.7	2883.03	4338.03	-48.6
	032400	081	261	-41.8	2870.03	4322.03	-48.8
	032500	081	263	-42.0	2857.03	4305.03	-48.9
	032600	083	261	-42.2	2844.03	4289.03	-49.1
	032700	083	259	-42.3	2831.03	4273.03	-49.3
	032800	084	262	-42.5	2819.03	4257.03	-49.5
	032900	087	266	-42.6	2806.03	4241.03	-49.7
	033000	089	269	-42.8	2794.03	4225.03	-49.9
	033100	089	271	-43.0	2781.03	4209.03	-50.1
	033200	090	272	-43.2	2768.03	4194.03	-50.3
	033300	090	274	-43.4	2756.03	4179.03	-50.4
	033400	090	273	-43.6	2744.03	4163.03	-50.6
	033500	088	274	-43.8	2731.03	4148.03	-50.8
	033600	089	275	-44.0	2719.03	4133.03	-51.0
	033700	089	274	-44.2	2707.03	4118.03	-51.2
	033800	086	274	-44.4	2695.03	4103.03	-51.3
	033900	086	273	-44.6	2682.03	4088.03	-51.5
	034000	087	274	-44.8	2670.03	4073.03	-51.7
	034100	086	273	-44.9	2658.03	4058.03	-51.9
	034200	087	274	-45.2	2646.03	4043.03	-52.1
	034300	084	273	-45.0	2634.03	4022.03	-52.4
	034400	091	271	-45.1	2622.03	4005.03	-52.6
	034500	095	270	-45.1	2610.03	3988.03	-52.8
	034600	097	269	-45.2	2598.03	3971.03	-53.0
	034700	099	269	-45.3	2587.03	3955.03	-53.2
	034800	100	269	-45.4	2575.03	3938.03	-53.5
	034900	101	268	-45.4	2563.03	3921.03	-53.7

TABLE 4. (Continued)

OFI NUMBER LAUNCH DATE 820322 METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
036000	103	103	270	-45.5	.2552+03	.3905+03	-53.9
035100	103	103	271	-45.6	.2540+03	.3888+03	-53.9
035200	103	103	272	-45.6	.2529+03	.3871+03	-53.9
035300	104	104	273	-45.7	.2517+03	.3855+03	-53.9
035400	107	107	276	-45.7	.2506+03	.3838+03	-53.9
035500	107	107	278	-45.8	.2494+03	.3822+03	-53.9
035600	109	109	281	-45.9	.2483+03	.3805+03	-53.9
035700	109	109	281	-45.9	.2472+03	.3789+03	-53.9
035800	107	107	279	-46.0	.2460+03	.3773+03	-53.9
035900	107	107	279	-46.0	.2449+03	.3757+03	-53.9
036000	106	106	278	-46.1	.2438+03	.3741+03	-53.9
036100	105	105	280	-46.4	.2427+03	.3728+03	-54.0
036200	103	103	279	-46.6	.2416+03	.3715+03	-54.1
036300	103	103	278	-46.9	.2405+03	.3703+03	-54.3
036400	105	105	278	-47.2	.2394+03	.3690+03	-54.4
036500	105	105	277	-47.4	.2383+03	.3678+03	-54.5
036600	104	104	277	-47.7	.2372+03	.3665+03	-54.6
036700	104	104	277	-48.0	.2361+03	.3653+03	-54.7
036800	103	103	272	-48.3	.2350+03	.3640+03	-54.9
036900	102	102	276	-48.5	.2340+03	.3628+03	-55.0
037000	103	103	278	-48.8	.2329+03	.3616+03	-55.1
037100	101	101	276	-48.9	.2318+03	.3601+03	-55.4
037200	101	101	276	-49.1	.2307+03	.3587+03	-55.6
037300	100	100	275	-49.2	.2297+03	.3573+03	-55.9
037400	099	099	274	-49.4	.2286+03	.3559+03	-56.1
037500	098	098	273	-49.5	.2276+03	.3544+03	-56.4
037600	100	100	274	-49.6	.2265+03	.3530+03	-56.7
037700	102	102	272	-49.8	.2255+03	.3516+03	-56.9
037800	103	103	271	-49.9	.2244+03	.3502+03	-57.2
037900	103	103	270	-50.1	.2234+03	.3488+03	-57.4
038000	104	104	271	-50.2	.2223+03	.3474+03	-57.7
038100	102	102	271	-50.3	.2213+03	.3460+03	-57.8
038200	104	104	270	-50.4	.2203+03	.3445+03	-57.9
038300	106	106	269	-50.5	.2193+03	.3431+03	-58.0
038400	106	106	270	-50.6	.2182+03	.3416+03	-58.1
038500	107	107	268	-50.7	.2172+03	.3402+03	-58.1
038600	110	110	269	-50.8	.2162+03	.3388+03	-58.2
038700	113	113	267	-50.9	.2152+03	.3373+03	-58.3
038800	114	114	265	-51.0	.2142+03	.3359+03	-58.4
038900	113	113	264	-51.1	.2132+03	.3345+03	-58.5
039000	113	113	263	-51.2	.2122+03	.3331+03	-58.6
039100	113	113	260	-51.4	.2112+03	.3318+03	-58.7
039200	109	109	260	-51.5	.2103+03	.3305+03	-58.9
039300	108	108	259	-51.7	.2093+03	.3292+03	-59.0
039400	106	106	256	-51.8	.2083+03	.3279+03	-59.2
039500	105	105	256	-52.0	.2073+03	.3266+03	-59.3
039600	105	105	259	-52.2	.2064+03	.3253+03	-59.4
039700	106	106	254	-52.3	.2054+03	.3240+03	-59.6
039800	105	105	257	-52.5	.2044+03	.3227+03	-59.7
039900	106	106	257	-52.6	.2035+03	.3215+03	-59.9

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TABLE 4. (Continued)

OFF NUMBER LAUNCH DATE 820322 METEOROLOGICAL DATA TAPE ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
040000	106	255	-52.0	.2025+03	.3202+03	-60.0
040100	106	255	-53.0	.2016+03	.3189+03	-60.2
040200	106	252	-53.1	.2006+03	.3176+03	-60.3
040300	105	254	-53.3	.1997+03	.3164+03	-60.5
040400	104	252	-53.4	.1987+03	.3151+03	-60.6
040500	105	250	-53.6	.1978+03	.3139+03	-60.8
040600	104	251	-51.8	.1969+03	.3126+03	-61.0
040700	105	250	-53.9	.1960+03	.3114+03	-61.1
040800	105	251	-54.1	.1950+03	.3101+03	-61.3
040900	107	250	-54.2	.1941+03	.3089+03	-61.4
041000	107	250	-54.4	.1932+03	.3077+03	-61.6
041100	107	249	-54.6	.1923+03	.3065+03	-61.7
041200	106	248	-54.8	.1914+03	.3053+03	-61.9
041300	105	248	-55.0	.1905+03	.3041+03	-62.0
041400	107	246	-55.2	.1896+03	.3029+03	-62.2
041500	104	248	-55.3	.1887+03	.3018+03	-62.3
041600	105	248	-55.5	.1878+03	.3006+03	-62.5
041700	106	248	-55.7	.1869+03	.2994+03	-62.6
041800	105	248	-55.9	.1860+03	.2983+03	-62.8
041900	106	248	-56.1	.1851+03	.2971+03	-62.9
042000	105	249	-56.3	.1842+03	.2960+03	-63.1
042100	105	247	-56.5	.1834+03	.2948+03	-63.3
042200	104	247	-56.6	.1825+03	.2936+03	-63.4
042300	105	245	-56.8	.1816+03	.2924+03	-63.6
042400	104	245	-56.9	.1807+03	.2912+03	-63.7
042500	106	244	-57.1	.1799+03	.2900+03	-63.9
042600	104	245	-57.3	.1790+03	.2889+03	-64.1
042700	105	245	-57.4	.1782+03	.2877+03	-64.2
042800	107	243	-57.6	.1773+03	.2865+03	-64.4
042900	105	245	-57.7	.1765+03	.2854+03	-64.5
043000	107	244	-57.9	.1756+03	.2842+03	-64.7
043100	107	243	-58.1	.1748+03	.2832+03	-64.9
043200	106	244	-58.4	.1739+03	.2821+03	-64.9
043300	107	244	-58.6	.1731+03	.2811+03	-64.9
043400	107	245	-58.9	.1723+03	.2801+03	-64.9
043500	106	245	-59.1	.1714+03	.2791+03	-64.9
043600	109	244	-59.4	.1706+03	.2780+03	-64.9
043700	108	247	-59.6	.1698+03	.2770+03	-64.9
043800	111	246	-59.9	.1689+03	.2760+03	-64.9
043900	112	245	-60.1	.1681+03	.2750+03	-64.9
044000	111	252	-60.4	.1673+03	.2740+03	-64.9
044100	112	246	-60.6	.1665+03	.2729+03	-64.9
044200	112	249	-60.8	.1657+03	.2719+03	-64.9
044300	112	252	-61.1	.1649+03	.2708+03	-64.9
044400	114	249	-61.3	.1641+03	.2698+03	-64.9
044500	114	249	-61.5	.1633+03	.2688+03	-64.9
044600	114	250	-61.7	.1625+03	.2677+03	-64.9
044700	115	250	-61.9	.1617+03	.2667+03	-64.9
044800	115	251	-62.2	.1609+03	.2657+03	-64.9
044900	117	249	-62.4	.1601+03	.2647+03	-64.9

TABLE 4. (Continued)

OFT NUMBER LAUNCH DATE R20322 METEOROLOGICAL DATA TAPE			WIND SPEED (FT/SEC)			WIND DIRECTION (DEG)			TEMPERATURE (DEG C)			PRESSURE (MILLIBARS)			DENSITY (GRAM/M ³)			DEW POINT (DEG C)		
ALTITUDE (FT)																				
045000	119	250	119	250	250	119	250	250	-62.6	1593.03	2636.03	-9999.	1593.03	2636.03	-9999.	1593.03	2636.03	-9999.	1593.03	2636.03
045100	117	251	117	251	251	117	251	251	-62.7	1586.03	2625.03	-9999.	1586.03	2625.03	-9999.	1586.03	2625.03	-9999.	1586.03	2625.03
045200	117	252	117	252	252	117	252	252	-62.8	1578.03	2613.03	-9999.	1578.03	2613.03	-9999.	1578.03	2613.03	-9999.	1578.03	2613.03
045300	118	252	118	252	252	118	252	252	-62.9	1570.03	2601.03	-9999.	1570.03	2601.03	-9999.	1570.03	2601.03	-9999.	1570.03	2601.03
045400	116	255	116	255	255	116	255	255	-63.0	1562.03	2590.03	-9999.	1562.03	2590.03	-9999.	1562.03	2590.03	-9999.	1562.03	2590.03
045500	117	255	117	255	255	117	255	255	-63.1	1555.03	2578.03	-9999.	1555.03	2578.03	-9999.	1555.03	2578.03	-9999.	1555.03	2578.03
045600	117	251	117	251	251	117	251	251	-63.2	1547.03	2567.03	-9999.	1547.03	2567.03	-9999.	1547.03	2567.03	-9999.	1547.03	2567.03
045700	116	257	116	257	257	116	257	257	-63.3	1539.03	2556.03	-9999.	1539.03	2556.03	-9999.	1539.03	2556.03	-9999.	1539.03	2556.03
045800	112	255	112	255	255	112	255	255	-63.4	1532.03	2544.03	-9999.	1532.03	2544.03	-9999.	1532.03	2544.03	-9999.	1532.03	2544.03
045900	112	258	112	258	258	112	258	258	-63.5	1524.03	2533.03	-9999.	1524.03	2533.03	-9999.	1524.03	2533.03	-9999.	1524.03	2533.03
046000	112	258	112	258	258	112	258	258	-63.6	1517.03	2522.03	-9999.	1517.03	2522.03	-9999.	1517.03	2522.03	-9999.	1517.03	2522.03
046100	112	261	112	261	261	112	261	261	-63.6	1509.03	2509.03	-9999.	1509.03	2509.03	-9999.	1509.03	2509.03	-9999.	1509.03	2509.03
046200	111	262	111	262	262	111	262	262	-63.6	1502.03	2497.03	-9999.	1502.03	2497.03	-9999.	1502.03	2497.03	-9999.	1502.03	2497.03
046300	110	261	110	261	261	110	261	261	-63.6	1495.03	2485.03	-9999.	1495.03	2485.03	-9999.	1495.03	2485.03	-9999.	1495.03	2485.03
046400	109	260	109	260	260	109	260	260	-63.6	1487.03	2472.03	-9999.	1487.03	2472.03	-9999.	1487.03	2472.03	-9999.	1487.03	2472.03
046500	110	262	110	262	262	110	262	262	-63.6	1480.03	2460.03	-9999.	1480.03	2460.03	-9999.	1480.03	2460.03	-9999.	1480.03	2460.03
046600	110	261	110	261	261	110	261	261	-63.6	1473.03	2448.03	-9999.	1473.03	2448.03	-9999.	1473.03	2448.03	-9999.	1473.03	2448.03
046700	111	262	111	262	262	111	262	262	-63.6	1465.03	2436.03	-9999.	1465.03	2436.03	-9999.	1465.03	2436.03	-9999.	1465.03	2436.03
046800	111	263	111	263	263	111	263	263	-63.6	1458.03	2424.03	-9999.	1458.03	2424.03	-9999.	1458.03	2424.03	-9999.	1458.03	2424.03
046900	106	264	106	264	264	106	264	264	-63.6	1451.03	2412.03	-9999.	1451.03	2412.03	-9999.	1451.03	2412.03	-9999.	1451.03	2412.03
047000	105	259	105	259	259	105	259	259	-63.6	1444.03	2400.03	-9999.	1444.03	2400.03	-9999.	1444.03	2400.03	-9999.	1444.03	2400.03
047100	101	267	101	267	267	101	267	267	-63.7	1437.03	2390.03	-9999.	1437.03	2390.03	-9999.	1437.03	2390.03	-9999.	1437.03	2390.03
047200	098	264	098	264	264	098	264	264	-63.9	1430.03	2380.03	-9999.	1430.03	2380.03	-9999.	1430.03	2380.03	-9999.	1430.03	2380.03
047300	095	266	095	266	266	095	266	266	-64.0	1422.03	2369.03	-9999.	1422.03	2369.03	-9999.	1422.03	2369.03	-9999.	1422.03	2369.03
047400	094	264	094	264	264	094	264	264	-64.1	1415.03	2359.03	-9999.	1415.03	2359.03	-9999.	1415.03	2359.03	-9999.	1415.03	2359.03
047500	093	263	093	263	263	093	263	263	-64.2	1408.03	2349.03	-9999.	1408.03	2349.03	-9999.	1408.03	2349.03	-9999.	1408.03	2349.03
047600	090	261	090	261	261	090	261	261	-64.4	1402.03	2339.03	-9999.	1402.03	2339.03	-9999.	1402.03	2339.03	-9999.	1402.03	2339.03
047700	089	260	089	260	260	089	260	260	-64.5	1395.03	2329.03	-9999.	1395.03	2329.03	-9999.	1395.03	2329.03	-9999.	1395.03	2329.03
047800	091	256	091	256	256	091	256	256	-64.6	1388.03	2318.03	-9999.	1388.03	2318.03	-9999.	1388.03	2318.03	-9999.	1388.03	2318.03
047900	087	254	087	254	254	087	254	254	-64.8	1381.03	2308.03	-9999.	1381.03	2308.03	-9999.	1381.03	2308.03	-9999.	1381.03	2308.03
048000	086	253	086	253	253	086	253	253	-64.9	1374.03	2298.03	-9999.	1374.03	2298.03	-9999.	1374.03	2298.03	-9999.	1374.03	2298.03
048100	087	252	087	252	252	087	252	252	-65.1	1367.03	2289.03	-9999.	1367.03	2289.03	-9999.	1367.03	2289.03	-9999.	1367.03	2289.03
048200	088	251	088	251	251	088	251	251	-65.2	1360.03	2279.03	-9999.	1360.03	2279.03	-9999.	1360.03	2279.03	-9999.	1360.03	2279.03
048300	086	251	086	251	251	086	251	251	-65.4	1354.03	2270.03	-9999.	1354.03	2270.03	-9999.	1354.03	2270.03	-9999.	1354.03	2270.03
048400	086	247	086	247	247	086	247	247	-65.6	1347.03	2260.03	-9999.	1347.03	2260.03	-9999.	1347.03	2260.03	-9999.	1347.03	2260.03
048500	089	243	089	243	243	089	243	243	-65.7	1340.03	2251.03	-9999.	1340.03	2251.03	-9999.	1340.03	2251.03	-9999.	1340.03	2251.03
048600	090	247	090	247	247	090	247	247	-65.9	1334.03	2242.03	-9999.	1334.03	2242.03	-9999.	1334.03	2242.03	-9999.	1334.03	2242.03
048700	091	244	091	244	244	091	244	244	-66.1	1327.03	2232.03	-9999.	1327.03	2232.03	-9999.	1327.03	2232.03	-9999.	1327.03	2232.03
048800	093	245	093	245	245	093	245	245	-66.3	1320.03	2223.03	-9999.	1320.03	2223.03	-9999.	1320.03	2223.03	-9999.	1320.03	2223.03
048900	092	252	092	252	252	092	252	252	-66.4	1314.03	2214.03	-9999.	1314.03	2214.03	-9999.	1314.03	2214.03	-9999.	1314.03	2214.03
049000	095	249	095	249	249	095	249	249	-66.6	1307.03	2205.03	-9999.	1307.03	2205.03	-9999.	1307.03	2205.03	-9999.	1307.03	2205.03
049100	095	252	095	252	252	095	252	252	-66.7	1301.03	2194.03	-9999.	1301.03	2194.03	-9999.	1301.03	2194.03	-9999.	1301.03	2194.03
049200	095	250	095	250	250	095	250	250	-66.7	1294.03	2184.03	-9999.	1294.03	2184.03	-9999.	1294.03	2184.03	-9999.	1294.03	2184.03
049300	095	254	095	254	254	095	254	254	-66.8	1288.03	2174.03	-9999.	1288.03	2174.03	-9999.	1288.03	2174.03	-9999.	1288.03	2174.03
049400	093	252	093	252	252	093	252	252	-66.9	1281.03	2164.03	-9999.	1281.03	2164.03	-9999.	1281.03	2164.03	-9999.	1281.03	2164.03
049500	090	253	090	253	253	090	253	253	-66.9	1275.03	2154.03	-9999.	1275.03	2154.03	-9999.	1275.03	2154.03	-9999.	1275.03	2154.03
049600	091	256	091	256	256	091	256	256	-67.0	1268.03	2144.03	-9999.	1268.03	2144.03	-9999.	1268.03	2144.03	-9999.	1268.03	2144.03
049700	090	255	090	255	255	090	255	255	-67.1	1262.03	2134.03	-9999.	1262.03	2134.03	-9999.	1262.03	2134.03	-9999.	1262.03	2134.03
049800	090	256	090	256	256	090	256	256	-67.2	1256.03	2124.03	-9999.	1256.03	2124.03	-9999.	1256.03	2124.03	-9999.	1256.03	2124.03
049900	092	257	092	257	257	092	257	257	-67.2	1249.03	2114.03	-9999.	1249.03	2114.03	-9999.	1249.03	2114.03	-9999.	1249.03	2114.03

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TABLE 4. (Continued)

OFF NUMBER	LAUNCH DATE 820322	METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
050500			256	093	256	-67.3	.1243+03	.2104+03	-9999.
050100			258	094	258	-67.4	.1237+03	.2094+03	-9999.
050200			258	094	258	-67.4	.1231+03	.2084+03	-9999.
050300			261	094	261	-67.5	.1225+03	.2075+03	-9999.
050400			259	093	259	-67.6	.1218+03	.2065+03	-9999.
050500			264	091	264	-67.6	.1212+03	.2055+03	-9999.
050600			264	088	264	-67.7	.1206+03	.2046+03	-9999.
050700			266	089	266	-67.8	.1200+03	.2036+03	-9999.
050800			269	087	269	-67.9	.1194+03	.2026+03	-9999.
050900			270	085	270	-67.9	.1188+03	.2017+03	-9999.
051000			272	080	272	-68.0	.1182+03	.2008+03	-9999.
051100			272	082	272	-68.2	.1176+03	.1999+03	-9999.
051200			270	082	270	-68.1	.1170+03	.1990+03	-9999.
051300			269	082	269	-68.5	.1164+03	.1982+03	-9999.
051400			271	084	271	-68.6	.1159+03	.1973+03	-9999.
051500			272	084	272	-68.8	.1153+03	.1965+03	-9999.
051600			270	082	270	-69.0	.1147+03	.1957+03	-9999.
051700			270	078	270	-69.1	.1141+03	.1948+03	-9999.
051800			268	077	268	-69.3	.1135+03	.1940+03	-9999.
051900			270	076	270	-69.4	.1130+03	.1932+03	-9999.
052000			268	076	268	-69.6	.1124+03	.1924+03	-9999.
052100			266	075	266	-69.7	.1118+03	.1915+03	-9999.
052200			263	072	263	-69.9	.1112+03	.1906+03	-9999.
052300			262	070	262	-70.0	.1107+03	.1898+03	-9999.
052400			262	068	262	-70.1	.1101+03	.1889+03	-9999.
052500			258	068	258	-70.2	.1096+03	.1881+03	-9999.
052600			261	068	261	-70.4	.1090+03	.1873+03	-9999.
052700			263	069	263	-70.5	.1084+03	.1864+03	-9999.
052800			263	070	263	-70.6	.1079+03	.1856+03	-9999.
052900			263	068	263	-70.8	.1073+03	.1848+03	-9999.
053000			260	067	260	-70.9	.1068+03	.1840+03	-9999.
053100			265	066	265	-71.0	.1063+03	.1831+03	-9999.
053200			266	066	266	-71.1	.1057+03	.1822+03	-9999.
053300			266	066	266	-71.2	.1052+03	.1814+03	-9999.
053400			263	065	263	-71.3	.1046+03	.1806+03	-9999.
053500			262	062	262	-71.3	.1041+03	.1797+03	-9999.
053600			266	058	266	-71.4	.1036+03	.1789+03	-9999.
053700			264	055	264	-71.5	.1030+03	.1780+03	-9999.
053800			267	055	267	-71.6	.1025+03	.1772+03	-9999.
053900			263	053	263	-71.7	.1020+03	.1764+03	-9999.
054000			261	050	261	-71.8	.1015+03	.1756+03	-9999.
054100			260	049	260	-71.9	.1009+03	.1747+03	-9999.
054200			256	050	256	-72.0	.1004+03	.1739+03	-9999.
054300			261	049	261	-72.1	.9992+02	.1731+03	-9999.
054400			260	049	260	-72.2	.9980+02	.1723+03	-9999.
054500			254	049	254	-72.3	.9969+02	.1715+03	-9999.
054600			254	049	254	-72.4	.9958+02	.1707+03	-9999.
054700			252	050	252	-72.5	.9948+02	.1699+03	-9999.
054800			252	050	252	-72.6	.9938+02	.1692+03	-9999.
054900			248	052	248	-72.7	.9928+02	.1684+03	-9999.

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TABLE 4. (Continued)

OFI NUMBER LAUNCH DATE 201322 METEOROLOGICAL DATA TAPE							3
ALTITUDE (FT)	WIND SPEED (KT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	NEW POINT (DEG C)	
655000	052	251	-72.8	.9638+02	.1676+03	-9999.	
655100	055	247	-73.0	.9588+02	.1669+03	-9999.	
655200	057	249	-73.2	.9539+02	.1662+03	-9999.	
655300	057	255	-73.4	.9489+02	.1655+03	-9999.	
655400	059	255	-73.6	.9440+02	.1648+03	-9999.	
655500	060	255	-73.7	.9391+02	.1641+03	-9999.	
655600	060	257	-73.9	.9343+02	.1634+03	-9999.	
655700	061	259	-74.1	.9294+02	.1627+03	-9999.	
655800	060	260	-74.3	.9246+02	.1620+03	-9999.	
655900	061	263	-74.5	.9199+02	.1613+03	-9999.	
656000	061	261	-74.7	.9151+02	.1606+03	-9999.	
656100	060	265	-74.7	.9104+02	.1598+03	-9999.	
656200	057	264	-74.6	.9056+02	.1589+03	-9999.	
656300	055	267	-74.6	.9009+02	.1581+03	-9999.	
656400	055	269	-74.6	.8962+02	.1572+03	-9999.	
656500	053	267	-74.6	.8916+02	.1564+03	-9999.	
656600	051	264	-74.5	.8870+02	.1556+03	-9999.	
656700	050	262	-74.5	.8824+02	.1547+03	-9999.	
656800	050	264	-74.5	.8778+02	.1539+03	-9999.	
656900	051	265	-74.4	.8732+02	.1531+03	-9999.	
657000	052	264	-74.4	.8687+02	.1523+03	-9999.	
658000	046	261	-74.1	.8648+02	.1444+03	-9999.	
659000	040	260	-72.2	.8603+02	.1358+03	-9999.	
660000	036	258	-71.4	.8568+02	.1285+03	-9999.	
661000	032	254	-70.9	.8533+02	.1218+03	-9999.	
662000	027	245	-70.1	.8508+02	.1153+03	-9999.	
663000	026	233	-70.7	.8483+02	.1099+03	-9999.	
664000	028	231	-69.4	.8468+02	.1037+03	-9999.	
665000	028	231	-67.9	.8453+02	.9792+02	-9999.	
666000	026	233	-66.4	.8438+02	.9247+02	-9999.	
667000	021	236	-64.4	.8423+02	.8713+02	-9999.	
668000	018	239	-61.0	.8408+02	.8163+02	-9999.	
669000	012	238	-59.8	.8393+02	.7733+02	-9999.	
670000	009	230	-59.7	.8378+02	.7364+02	-9999.	
671000	008	220	-59.4	.8363+02	.7006+02	-9999.	
672000	008	215	-58.5	.8348+02	.6649+02	-9999.	
673000	007	221	-57.9	.8333+02	.6320+02	-9999.	
674000	007	234	-57.7	.8318+02	.6014+02	-9999.	
675000	005	245	-57.2	.8303+02	.5724+02	-9999.	
676000	002	274	-55.8	.8288+02	.5422+02	-9999.	
677000	002	028	-56.0	.8273+02	.5175+02	-9999.	
678000	005	051	-56.1	.8258+02	.4939+02	-9999.	
679000	008	062	-55.8	.8243+02	.4703+02	-9999.	
680000	011	072	-54.1	.8228+02	.4450+02	-9999.	
681000	007	078	-53.2	.8213+02	.4229+02	-9999.	
682000	003	106	-52.6	.8198+02	.4025+02	-9999.	
683000	004	213	-52.6	.8183+02	.3841+02	-9999.	
684000	015	254	-51.3	.8168+02	.3645+02	-9999.	
685000	022	238	-50.5	.8153+02	.3467+02	-9999.	
686000	026	240	-50.0	.8138+02	.3303+02	-9999.	

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TABLE 4. (Continued)

OFI NUMBER LAUNCH DATE 6203- METEOROLOGICAL DATA TAPE	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	NEW POINT (DEG C)
087000	031	243	-49.8	.2020+02	.3151+02	-9999.
088000	034	246	-49.6	.1929+02	.3006+02	-9999.
089000	036	250	-49.3	.1842+02	.2867+02	-9999.
090000	037	254	-48.8	.1759+02	.2731+02	-9999.
091000	038	255	-48.7	.1681+02	.2609+02	-9999.
092000	038	255	-48.6	.1605+02	.2490+02	-9999.
093000	038	251	-48.1	.1533+02	.2373+02	-9999.
094000	040	246	-47.5	.1465+02	.2262+02	-9999.
095000	042	241	-46.8	.1400+02	.2155+02	-9999.
096000	044	237	-46.1	.1337+02	.2051+02	-9999.
097000	048	234	-45.5	.1278+02	.1956+02	-9999.
098000	048	240	-43.5	.1225+02	.1858+02	-9999.
099000	050	248	-41.6	.1173+02	.1765+02	-9999.
100000	054	254	-40.8	.1122+02	.1682+02	-9999.
101000	055	261	-40.3	.1074+02	.1605+02	-9999.
102000	060	267	-39.7	.1027+02	.1533+02	-9999.
103000	062	271	-39.3	.9831+01	.1465+02	-9999.
104000	065	276	-38.9	.9408+01	.1399+02	-9999.
105000	067	277	-38.6	.9004+01	.1337+02	-9999.
106000	067	278	-37.9	.8618+01	.1276+02	-9999.
107000	067	278	-36.3	.8251+01	.1213+02	-9999.
108000	067	278	-34.4	.7902+01	.1153+02	-9999.
109000	067	279	-32.7	.7570+01	.1097+02	-9999.
110000	067	279	-31.3	.7254+01	.1045+02	-9999.
111000	067	278	-30.5	.6952+01	.9983+01	-9999.
112000	067	277	-30.0	.6664+01	.9547+01	-9999.
113000	065	277	-29.5	.6348+01	.9133+01	-9999.
114000	060	273	-29.0	.6125+01	.8739+01	-9999.
115000	057	264	-28.5	.5873+01	.8362+01	-9999.
116000	057	255	-28.1	.5631+01	.8004+01	-9999.
117000	059	251	-27.3	.5400+01	.7653+01	-9999.
118000	064	247	-25.9	.5180+01	.7299+01	-9999.
119000	065	246	-25.3	.4949+01	.6984+01	-9999.
120000	069	245	-25.1	.4767+01	.6696+01	-9999.
121000	070	246	-25.0	.4574+01	.6420+01	-9999.
122000	074	250	-24.8	.4389+01	.6157+01	-9999.
123000	074	255	-24.7	.4211+01	.5904+01	-9999.
124000	084	256	-24.5	.4040+01	.5662+01	-9999.
125000	087	257	-24.3	.3877+01	.5427+01	-9999.
126000	084	259	-23.8	.3721+01	.5197+01	-9999.
127000	089	259	-23.1	.3571+01	.4975+01	-9999.
128000	087	259	-22.5	.3427+01	.4763+01	-9999.
129000	089	258	-21.8	.3290+01	.4561+01	-9999.
130000	092	255	-21.2	.3158+01	.4367+01	-9999.
131000	097	251	-20.6	.3033+01	.4184+01	-9999.
132000	104	247	-19.9	.2912+01	.4006+01	-9999.
133000	113	246	-18.9	.2796+01	.3831+01	-9999.
134000	119	248	-17.4	.2686+01	.3654+01	-9999.
135000	126	248	-15.6	.2581+01	.3494+01	-9999.
136000	130	251	-14.4	.2480+01	.3345+01	-9999.

TABLE 4. (Continued)

OFF NUMBER LAUNCH DATE 020322 METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	Dew POINT (DEG C)
	13200	133	255	-14.5	.2389+01	.1210+01	-9999.
	13600	136	258	-14.2	.2291+01	.3083+01	-9999.
	13600	138	259	-14.1	.2202+01	.2961+01	-9999.
	14000	140	259	-13.8	.2117+01	.2844+01	-9999.
	14100	140	259	-13.6	.2035+01	.2732+01	-9999.
	14200	140	259	-13.5	.1956+01	.2624+01	-9999.
	14100	138	258	-13.3	.1880+01	.2521+01	-9999.
	14400	136	256	-13.1	.1808+01	.2422+01	-9999.
	14500	140	253	-13.0	.1738+01	.2327+01	-9999.
	14600	140	253	-12.5	.1671+01	.2233+01	-9999.
	14700	141	253	-11.8	.1606+01	.2141+01	-9999.
	14800	146	253	-10.7	.1545+01	.2051+01	-9999.
	14900	150	253	-9.4	.1486+01	.1962+01	-9999.
	15000	157	254	-8.2	.1429+01	.1879+01	-9999.
	15100	163	254	-7.1	.1375+01	.1801+01	-9999.
	15200	167	255	-6.5	.1323+01	.1729+01	-9999.
	15300	170	257	-6.0	.1273+01	.1661+01	-9999.
	15400	172	259	-5.6	.1226+01	.1596+01	-9999.
	15500	172	261	-5.3	.1180+01	.1534+01	-9999.
	15600	172	263	-5.0	.1135+01	.1475+01	-9999.
	15700	170	266	-4.5	.1093+01	.1417+01	-9999.
	15800	172	264	-4.3	.1052+01	.1363+01	-9999.
	15900	192	263	-4.2	.1013+01	.1312+01	-9999.
	16000	212	267	-4.5	.9749+00	.1264+01	-9999.
	16100	214	273	-4.9	.9385+00	.1219+01	-9999.
	16200	203	273	-5.2	.9033+00	.1174+01	-9999.
	16300	189	272	-5.7	.8694+00	.1133+01	-9999.
	16400	184	268	-5.8	.8368+00	.1091+01	-9999.
	16500	182	266	-5.6	.8054+00	.1049+01	-9999.
	16600	185	268	-5.2	.7752+00	.1004+01	-9999.
	16700	184	268	-5.0	.7462+00	.9693+00	-9999.
	16800	182	266	-4.8	.7183+00	.9323+00	-9999.
	16900	184	265	-4.4	.6914+00	.8963+00	-9999.
	17000	184	267	-4.2	.6656+00	.8620+00	-9999.
	17100	175	264	-4.0	.6408+00	.8294+00	-9999.
	17200	173	258	-3.7	.6169+00	.7976+00	-9999.
	17300	177	257	-3.6	.5940+00	.7676+00	-9999.
	17400	149	257	-3.2	.5719+00	.7381+00	-9999.
	17500	195	257	-3.1	.5507+00	.7103+00	-9999.
	17600	199	257	-2.8	.5302+00	.6832+00	-9999.
	17700	202	255	-3.3	.5100	.6591+00	-9999.
	17800	204	254	-4.1	.4900	.6364+00	-9999.
	17900	204	252	-5.0	.4700	.6137+00	-9999.
	18000	197	250	-5.7	.4500	.5934+00	-9999.
	18100	199	248	-6.6	.4304+00	.5729+00	-9999.
	18200	200	247	-7.4	.4119+00	.5531+00	-9999.
	18300	199	246	-8.1	.4000+00	.5336+00	-9999.
	18400	202	249	-9.0	.3906+00	.5151+00	-9999.
	18500	212	252	-9.6	.3754+00	.4967+00	-9999.
	18600	214	255	-10.5	.3615+00	.4794+00	-9999.

TABLE 4. (Continued)

OFI NUMBER	LAUNCH DATE 020322	METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (INLG C)
18700			222	256	-11.2	.3477+00	.8623+00	-9999.	
18800			231	255	-11.9	.3344+00	.8459+00	-9999.	
18900			231	255	-12.8	.3215+00	.8301+00	-9999.	
19000			231	253	-13.4	.304+00	.8147+00	-9999.	
19100			234	252	-14.2	.2972+00	.3998+00	-9999.	
19200			239	249	-14.9	.2857+00	.3854+00	-9999.	
19300			244	248	-15.4	.2747+00	.3715+00	-9999.	
19400			255	249	-16.5	.2640+00	.3563+00	-9999.	
19500			263	251	-17.3	.2537+00	.3454+00	-9999.	
19600			266	255	-17.8	.2437+00	.3325+00	-9999.	
19700			268	259	-18.7	.2342+00	.3206+00	-9999.	
19800			265	261	-19.5	.2250+00	.3090+00	-9999.	
19900			254	264	-20.1	.2161+00	.2975+00	-9999.	
20000			249	266	-21.0	.2075+00	.2867+00	-9999.	
20100			243	268	-21.8	.1993+00	.2762+00	-9999.	
20200			244	269	-22.4	.1914+00	.2659+00	-9999.	
20300			248	268	-23.3	.1837+00	.2561+00	-9999.	
20400			248	268	-24.3	.1764+00	.2469+00	-9999.	
20500			251	267	-25.5	.1693+00	.2381+00	-9999.	
20600			254	263	-25.8	.1625+00	.2289+00	-9999.	
20700			249	262	-26.5	.1559+00	.2201+00	-9999.	
20800			249	263	-26.7	.1496+00	.2114+00	-9999.	
20900			251	263	-26.5	.1435+00	.2027+00	-9999.	
21000			251	263	-26.5	.1377+00	.1945+00	-9999.	
21100			255	261	-27.1	.1321+00	.1872+00	-9999.	
21200			263	266	-27.3	.1268+00	.1797+00	-9999.	
21300			263	269	-27.5	.1216+00	.1724+00	-9999.	
21400			260	272	-27.6	.1167+00	.1656+00	-9999.	
21500			261	272	-27.4	.1120+00	.1587+00	-9999.	
21600			260	274	-27.8	.1074+00	.1525+00	-9999.	
21700			254	276	-28.1	.1030+00	.1465+00	-9999.	
21800			253	278	-28.8	.9800-01	.1409+00	-9999.	
21900			251	278	-29.8	.9480-01	.1357+00	-9999.	
22000			246	278	-31.0	.9070-01	.1306+00	-9999.	
22100			239	278	-32.8	.8720-01	.1264+00	-9999.	
22200			236	277	-34.4	.8350-01	.1218+00	-9999.	
22300			234	275	-35.8	.8000-01	.1174+00	-9999.	
22400			229	274	-38.2	.7670-01	.1137+00	-9999.	
22500			222	274	-40.8	.7340-01	.1101+00	-9999.	
22600			214	276	-43.7	.6950-01	.1055+00	-9999.	
22700			200	273	-45.4	.6600-01	.1010+00	-9999.	
22800			180	264	-48.0	.6250-01	.9670-01	-9999.	
22900			160	259	-52.0	.5900-01	.9294-01	-9999.	
23000			133	262	-55.0	.5550-01	.8463-01	-9999.	
23100			121	265	-62.2	.5200-01	.8587-01	-9999.	
23200			109	268	-63.7	.4870-01	.8101-01	-9999.	
23300			097	272	-65.2	.4640-01	.7775-01	-9999.	
23400			086	276	-66.4	.4420-01	.7461-01	-9999.	
23500			074	279	-68.2	.4210-01	.7154-01	-9999.	
23600			064	283	-68.2	.4000-01	.6797-01	-9999.	

TABLE 4. (Continued)

OF FOUR QUALITY							
OFF NUMBER	LAUNCH DATE 820322	METEOROLOGICAL DATA TAPE					
ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)	
231000	052	286	-68.3	.3810-01	.6481-01	-9999.	
238000	040	289	-69.2	.3620-01	.6182-01	-9999.	
239000	027	292	-68.9	.3450-01	.5885-01	-9999.	
240000	015	296	-68.2	.3280-01	.5574-01	-9999.	
241000	001	321	-67.9	.3120-01	.5295-01	-9999.	
242000	011	114	-67.2	.2970-01	.5023-01	-9999.	
243000	023	118	-66.2	.2830-01	.4763-01	-9999.	
244000	037	120	-66.2	.2700-01	.4548-01	-9999.	
245000	050	122	-66.2	.2570-01	.4325-01	-9999.	
246000	062	124	-66.2	.2440-01	.4106-01	-9999.	
247000	074	126	-67.2	.2330-01	.3940-01	-9999.	
248000	084	127	-68.1	.2210-01	.3755-01	-9999.	
249000	094	129	-68.2	.2110-01	.3586-01	-9999.	
250000	104	131	-69.2	.2010-01	.3432-01	-9999.	
251000	114	132	-70.2	.1910-01	.3278-01	-9999.	
252000	123	134	-71.2	.1820-01	.3139-01	-9999.	
253000	130	135	-71.7	.1730-01	.2992-01	-9999.	
254000	136	137	-72.3	.1640-01	.2845-01	-9999.	
255000	143	139	-73.2	.1560-01	.2717-01	-9999.	
256000	148	140	-74.3	.1480-01	.2593-01	-9999.	
257000	153	142	-75.2	.1410-01	.2481-01	-9999.	
258000	157	144	-76.2	.1340-01	.2370-01	-9999.	
259000	160	145	-76.9	.1270-01	.2254-01	-9999.	
260000	151	145	-76.8	.1208-01	.2145-01	-9999.	
261000	141	145	-76.7	.1150-01	.2041-01	-9999.	
262000	132	146	-76.6	.1094-01	.1942-01	-9999.	
263000	123	147	-76.5	.1041-01	.1848-01	-9999.	
264000	113	147	-76.4	.9908-02	.1758-01	-9999.	
265000	104	148	-76.3	.9428-02	.1673-01	-9999.	
266000	095	149	-76.3	.8971-02	.1592-01	-9999.	
267000	086	150	-76.2	.8536-02	.1515-01	-9999.	
268000	077	152	-76.1	.8123-02	.1442-01	-9999.	
269000	068	154	-76.0	.7729-02	.1372-01	-9999.	
270000	059	157	-75.9	.7355-02	.1305-01	-9999.	
271000	050	160	-75.8	.6999-02	.1242-01	-9999.	
272000	041	165	-75.7	.6660-02	.1182-01	-9999.	
273000	031	171	-75.6	.6337-02	.1125-01	-9999.	
274000	026	184	-75.6	.6030-02	.1070-01	-9999.	
275000	030	182	-76.6	.5180-02	.9150-02	-9999.	
276000	030	179	-77.5	.4440-02	.7890-02	-9999.	
277000	023	175	-78.3	.3790-02	.6770-02	-9999.	
278000	016	168	-79.2	.3240-02	.5810-02	-9999.	
279000	009	151	-80.0	.2770-02	.4990-02	-9999.	
280000	006	098	-80.8	.2370-02	.4280-02	-9999.	
281000	009	048	-81.6	.2030-02	.3670-02	-9999.	
282000	006	000	-83.2	.1630-02	.2970-02	-9999.	
283000	009	298	-82.3	.1390-02	.2520-02	-9999.	
284000	017	280	-81.4	.1140-02	.2130-02	-9999.	
285000	025	274	-80.4	.1010-02	.1810-02	-9999.	
286000	032	271	-79.5	.8600-03	.1530-02	-9999.	

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OF POOR QUALITY

TABLE 4. (Concluded)

OFF NUMBER	LAUNCH DATE 820322	3	METEOROLOGICAL DATA TAPE	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	OCM POINT (DEG C)
ALTITUDE (FT)									
313000		036	269	-78.1	.7360-03	.1300-02	-9999.		
316000		038	269	-76.2	.6320-03	.1100-02	-9999.		
319000		039	269	-74.2	.5430-03	.9310-03	-9999.		
322000		040	269	-72.3	.4660-03	.7490-03	-9999.		
325000		039	268	-70.4	.4000-03	.6690-03	-9999.		
328000		038	267	-68.4	.3440-03	.5670-03	-9999.		
331000		039	268	-68.7	.2980-03	.4810-03	-9999.		
334000		041	267	-60.9	.2580-03	.4080-03	-9999.		
337000		041	266	-57.2	.2230-03	.3470-03	-9999.		
340000		040	265	-53.4	.1930-03	.2940-03	-9999.		
343000		038	263	-49.7	.1670-03	.2500-03	-9999.		
346000		037	264	-44.2	.1460-03	.2130-03	-9999.		
349000		038	263	-37.0	.1290-03	.1820-03	-9999.		
352000		038	260	-29.8	.1140-03	.1560-03	-9999.		
355000		037	256	-22.6	.1010-03	.1330-03	-9999.		
358000		035	251	-15.4	.8900-04	.1140-03	-9999.		
361000		029	255	-8.1	.7850-04	.9730-04	-9999.		
364000		028	249	1.9	.7130-04	.8490-04	-9999.		
367000		027	241	12.0	.6460-04	.7400-04	-9999.		
370000		026	230	22.1	.5840-04	.6450-04	-9999.		
373000		025	214	32.1	.5280-04	.5620-04	-9999.		
376000		027	193	42.2	.4770-04	.4900-04	-9999.		
379000		016	189	53.1	.4340-04	.4300-04	-9999.		
382000		016	190	64.8	.3990-04	.3810-04	-9999.		
385000		020	191	76.9	.3690-04	.3380-04	-9999.		
388000		022	191	89.3	.3410-04	.3010-04	-9999.		
391000		024	191	102.1	.3160-04	.2690-04	-9999.		
394000		027	192	115.1	.2940-04	.2420-04	-9999.		
397000		029	192	128.4	.2740-04	.2170-04	-9999.		
400000		032	193	141.8	.2560-04	.1960-04	-9999.		

TABLE 5. STS-3 FINAL SRB DESCENT METEOROLOGICAL DATA TAPE

METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
	000000	020	260	24.0	.1014+04	.1178+04	20.0
	001000	026	344	23.0	.9809+03	.1143+04	20.0
	002000	023	314	22.0	.9476+03	.1109+04	18.5
	003000	023	293	21.4	.9150+03	.1076+04	11.6
	004000	023	279	20.1	.8834+03	.1045+04	6.1
	005000	026	262	17.8	.8527+03	.1017+04	4.4
	006000	036	241	15.8	.8228+03	.9887+03	2.5
	007000	050	233	14.8	.7938+03	.9591+03	-3.1
	008000	051	235	15.2	.7657+03	.9237+03	-9.3
	009000	050	239	13.2	.7346+03	.8973+03	-10.2
	010000	051	240	12.6	.7123+03	.8675+03	-15.7
	011000	054	241	11.2	.6868+03	.8407+03	-17.0
	012000	054	246	8.7	.6621+03	.8176+03	-16.7
	013000	055	251	6.5	.6381+03	.7943+03	-18.9
	014000	054	255	3.9	.6148+03	.7725+03	-20.4
	015000	057	250	1.8	.5921+03	.7497+03	-22.1
	016000	061	248	.0	.5701+03	.7267+03	-23.8
	017000	063	251	-2.0	.5488+03	.7047+03	-25.5
	018000	068	249	-4.0	.5281+03	.6833+03	-26.4
	019000	075	246	-6.6	.5081+03	.6638+03	-28.9
	020000	080	246	-8.6	.4886+03	.6432+03	-30.5
	021000	084	247	-11.1	.4698+03	.6243+03	-32.6
	022000	085	252	-13.9	.4514+03	.6065+03	-34.9
	023000	083	257	-15.9	.4337+03	.5872+03	-36.2
	024000	084	259	-18.6	.4165+03	.5699+03	-38.3
	025000	087	256	-20.6	.3998+03	.5514+03	-39.9
	026000	087	253	-23.0	.3836+03	.5342+03	-41.7
	027000	087	253	-24.9	.3680+03	.5164+03	-42.8
	028000	085	254	-27.3	.3529+03	.5000+03	-42.8
	029000	084	258	-29.7	.3382+03	.4840+03	-44.3
	030000	087	264	-32.2	.3241+03	.4685+03	-46.0
	031000	084	271	-34.7	.3104+03	.4534+03	-47.7
	032000	091	274	-37.3	.2971+03	.4384+03	-49.7
	033000	096	275	-39.6	.2843+03	.4240+03	-51.7
	034000	102	275	-42.0	.2719+03	.4097+03	-53.0
	035000	108	275	-43.0	.2599+03	.3935+03	-54.1
	036000	114	279	-43.4	.2485+03	.3768+03	-55.1
	037000	115	279	-44.3	.2375+03	.3615+03	-56.0
	038000	113	272	-46.3	.2270+03	.3485+03	-57.7
	039000	111	265	-47.8	.2169+03	.3352+03	-59.4
	040000	110	261	-48.6	.2071+03	.3212+03	-60.4
	041000	110	256	-50.3	.1977+03	.3090+03	-61.8
	042000	115	244	-51.7	.1887+03	.2968+03	-63.0
	043000	114	246	-54.4	.1800+03	.2867+03	-65.2
	044000	110	259	-56.0	.1717+03	.2754+03	-66.6
	045000	107	263	-57.1	.1637+03	.2639+03	-67.5
	046000	106	263	-58.6	.1560+03	.2533+03	-68.9
	047000	103	263	-59.4	.1486+03	.2427+03	-69.9
	048000	102	260	-61.4	.1416+03	.2329+03	-69.9
	049000	102	255	-67.7	.1348+03	.2231+03	-69.9

TABLE 5. (Continued)

OFI NUMBER	LAUNCH DATE 820322	METEOROLOGICAL DATA TAPE	WIND SPEED (FT/SLC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
ALTITUDE (FT)								
050000			102	252	-64.5	.1283+03	.2142+03	-9999.
051000			100	252	-65.7	.1221+03	.2050+03	-9999.
052000			095	255	-66.3	.1161+03	.1950+03	-9999.
053000			092	258	-68.0	.1104+03	.1876+03	-9999.
054000			089	261	-68.1	.1050+03	.1784+03	-9999.
055000			081	265	-68.6	.0985+02	.1701+03	-9999.
056000			069	268	-68.5	.0943+02	.1616+03	-9999.
057000			058	269	-68.3	.0926+02	.1535+03	-9999.
058000			049	263	-68.6	.0882+02	.1462+03	-9999.
059000			045	253	-68.2	.0859+02	.1387+03	-9999.
060000			042	248	-68.5	.0758+02	.1321+03	-9999.
061000			040	245	-68.7	.0736+02	.1257+03	-9999.
062000			038	240	-69.2	.07012+02	.1198+03	-9999.
063000			036	235	-68.9	.0666+02	.1137+03	-9999.
064000			033	232	-67.2	.0638+02	.1072+03	-9999.
065000			029	232	-65.8	.0609+02	.1013+03	-9999.
066000			022	235	-65.1	.05737+02	.0960+02	-9999.
067000			017	237	-63.6	.05460+02	.0908+02	-9999.
068000			013	237	-62.0	.05198+02	.0876+02	-9999.
069000			011	233	-59.9	.04951+02	.0808+02	-9999.
070000			013	224	-58.5	.04718+02	.07657+02	-9999.
071000			017	212	-57.1	.04497+02	.07251+02	-9999.
072000			019	208	-56.0	.04288+02	.06879+02	-9999.
073000			018	210	-55.4	.04089+02	.06542+02	-9999.
074000			015	209	-54.9	.03900+02	.06225+02	-9999.
075000			012	204	-54.2	.03720+02	.05919+02	-9999.
076000			011	195	-53.1	.03549+02	.05619+02	-9999.
077000			008	175	-53.4	.03387+02	.05369+02	-9999.
078000			007	168	-52.8	.03232+02	.05110+02	-9999.
079000			006	174	-51.9	.03084+02	.04856+02	-9999.
080000			008	181	-51.4	.02944+02	.04625+02	-9999.
081000			008	189	-51.8	.02810+02	.04422+02	-9999.
082000			004	216	-51.0	.02682+02	.04206+02	-9999.
083000			003	254	-50.9	.02561+02	.04014+02	-9999.
084000			005	272	-50.9	.02445+02	.03832+02	-9999.
085000			006	271	-51.0	.02334+02	.03660+02	-9999.
086000			009	270	-49.7	.02228+02	.03474+02	-9999.
087000			012	270	-48.8	.02128+02	.03304+02	-9999.
088000			015	254	-47.8	.02033+02	.03143+02	-9999.
089000			024	241	-46.7	.01942+02	.02988+02	-9999.
090000			029	232	-45.7	.01856+02	.02843+02	-9999.
091000			030	235	-45.7	.01774+02	.02717+02	-9999.
092000			031	238	-45.8	.01695+02	.02597+02	-9999.
093000			031	241	-46.1	.01610+02	.02470+02	-9999.
094000			035	239	-46.4	.01530+02	.02351+02	-9999.
095000			042	235	-45.8	.01460+02	.02237+02	-9999.
096000			050	232	-43.9	.01390+02	.02112+02	-9999.
097000			047	231	-43.3	.01320+02	.02000+02	-9999.
098000			048	240	-43.5	.01250+02	.01896+02	-9999.
099000			050	248	-41.6	.01180+02	.01775+02	-9999.

TABLE 5. (Continued)

OFF NUMBER LAUNCH DATE 820322 METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
	10000	054	254	-40.8	.1122+02	.1682+02	-9999.
	10100	055	261	-40.1	.1074+02	.1605+02	-9999.
	10200	060	267	-39.7	.1027+02	.1533+02	-9999.
	10300	062	271	-39.3	.9831+02	.1465+02	-9999.
	10400	065	276	-38.9	.9408+01	.1399+02	-9999.
	10500	067	277	-38.6	.9004+01	.1337+02	-9999.
	10600	067	278	-37.8	.8618+01	.1276+02	-9999.
	10700	067	278	6.3	.8251+01	.1213+02	-9999.
	10800	067	278	-34.4	.7902+01	.1153+02	-9999.
	10900	067	279	-32.7	.7570+01	.1097+02	-9999.
	11000	067	279	-31.3	.7254+01	.1045+02	-9999.
	11100	067	278	-30.5	.6952+01	.9863+01	-9999.
	11200	067	277	-30.0	.6664+01	.9547+01	-9999.
	11300	065	277	-29.5	.6388+01	.9133+01	-9999.
	11400	060	273	-29.0	.6125+01	.8739+01	-9999.
	11500	057	264	-28.5	.5873+01	.8362+01	-9999.
	11600	057	255	-28.1	.5631+01	.8004+01	-9999.
	11700	059	251	-27.3	.5400+01	.7553+01	-9999.
	11800	064	247	-25.9	.5180+01	.7299+01	-9999.
	11900	065	246	-25.3	.4965+01	.6984+01	-9999.
	12000	069	245	-25.1	.4767+01	.6696+01	-9999.
	12100	070	246	-25.0	.4574+01	.6420+01	-9999.
	12200	074	250	-24.8	.4389+01	.6157+01	-9999.
	12300	079	255	-24.7	.4211+01	.5904+01	-9999.
	12400	084	256	-24.5	.4040+01	.5662+01	-9999.
	12500	087	257	-24.3	.3877+01	.5427+01	-9999.
	12600	089	259	-23.8	.3721+01	.5197+01	-9999.
	12700	089	259	-23.1	.3571+01	.4975+01	-9999.
	12800	087	259	-22.5	.3427+01	.4763+01	-9999.
	12900	089	258	-21.8	.3290+01	.4561+01	-9999.
	13000	092	255	-21.2	.3158+01	.4367+01	-9999.
	13100	097	251	-20.6	.3033+01	.4184+01	-9999.
	13200	104	247	-19.9	.2914+01	.4006+01	-9999.
	13300	113	246	-18.9	.2796+01	.3831+01	-9999.
	13400	119	248	-17.4	.2686+01	.3658+01	-9999.
	13500	126	248	-15.8	.2581+01	.3494+01	-9999.
	13600	130	251	-14.8	.2480+01	.3345+01	-9999.
	13700	133	255	-14.5	.2384+01	.3210+01	-9999.
	13800	136	258	-14.2	.2291+01	.3083+01	-9999.
	13900	136	259	-14.1	.2202+01	.2961+01	-9999.
	14000	140	259	-13.8	.2117+01	.2844+01	-9999.
	14100	140	259	-13.6	.2035+01	.2732+01	-9999.
	14200	140	259	-13.5	.1956+01	.2624+01	-9999.
	14300	136	258	-13.3	.1880+01	.2521+01	-9999.
	14400	138	256	-13.1	.1808+01	.2427+01	-9999.
	14500	140	253	-13.0	.1738+01	.2327+01	-9999.
	14600	140	253	-12.5	.1671+01	.2233+01	-9999.
	14700	141	253	-11.8	.1606+01	.2141+01	-9999.
	14800	146	253	-10.7	.1545+01	.2051+01	-9999.
	14900	150	253	-9.4	.1486+01	.1967+01	-9999.

TABLE 5. (Continued)

UFT NUMBER	LAUNCH DATE 820322	METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
150000			157	254	-8.2	.1429+01	.1801+01	.1679+01	-9999.
151000			163	254	-7.1	.1375+01	.1729+01	.1801+01	-9999.
152000			167	255	-6.5	.1323+01	.1729+01	.1729+01	-9999.
153000			170	257	-6.0	.1273+01	.1661+01	.1661+01	-9999.
154000			172	259	-5.6	.1226+01	.1596+01	.1596+01	-9999.
155000			172	261	-5.3	.1180+01	.1534+01	.1534+01	-9999.
156000			172	263	-5.0	.1135+01	.1475+01	.1475+01	-9999.
157000			170	266	-4.5	.1093+01	.1417+01	.1417+01	-9999.
158000			172	264	-4.3	.1052+01	.1363+01	.1363+01	-9999.
159000			192	263	-4.2	.1013+01	.1312+01	.1312+01	-9999.
160000			212	267	-4.5	.9749+00	.1264+01	.1264+01	-9999.
161000			214	273	-4.9	.9385+00	.1219+01	.1219+01	-9999.
162000			200	273	-5.2	.9033+00	.1174+01	.1174+01	-9999.
163000			189	272	-5.7	.8694+00	.1133+01	.1133+01	-9999.
164000			184	268	-5.8	.8368+00	.1091+01	.1091+01	-9999.
165000			182	266	-5.6	.8054+00	.1049+01	.1049+01	-9999.
166000			185	268	-5.2	.7752+00	.1008+01	.1008+01	-9999.
167000			184	268	-5.0	.7462+00	.9693+00	.9693+00	-9999.
168000			182	266	-4.8	.7183+00	.9323+00	.9323+00	-9999.
169000			184	265	-4.4	.6914+00	.8963+00	.8963+00	-9999.
170000			184	267	-4.2	.6656+00	.8620+00	.8620+00	-9999.
171000			175	264	-4.0	.6408+00	.8294+00	.8294+00	-9999.
172000			173	258	-3.7	.6169+00	.7976+00	.7976+00	-9999.
173000			177	257	-3.6	.5940+00	.7676+00	.7676+00	-9999.
174000			189	257	-3.2	.5719+00	.7381+00	.7381+00	-9999.
175000			195	257	-3.1	.5507+00	.7103+00	.7103+00	-9999.
176000			199	257	-2.8	.5302+00	.6832+00	.6832+00	-9999.
177000			202	255	-3.3	.5105+00	.6591+00	.6591+00	-9999.
178000			204	254	-4.1	.4915+00	.6364+00	.6364+00	-9999.
179000			206	252	-5.0	.4732+00	.6147+00	.6147+00	-9999.
180000			197	250	-5.7	.4555+00	.5934+00	.5934+00	-9999.
181000			199	248	-6.6	.4384+00	.5729+00	.5729+00	-9999.
182000			200	247	-7.4	.4219+00	.5531+00	.5531+00	-9999.
183000			199	246	-8.1	.4060+00	.5336+00	.5336+00	-9999.
184000			202	249	-9.0	.3906+00	.5151+00	.5151+00	-9999.
185000			212	252	-9.6	.3758+00	.4967+00	.4967+00	-9999.
186000			214	255	-10.5	.3615+00	.4794+00	.4794+00	-9999.
187000			222	256	-11.2	.3477+00	.4623+00	.4623+00	-9999.
188000			231	255	-11.9	.3344+00	.4459+00	.4459+00	-9999.
189000			231	253	-12.8	.3215+00	.4301+00	.4301+00	-9999.
190000			231	253	-13.4	.3092+00	.4147+00	.4147+00	-9999.
191000			234	252	-14.2	.2972+00	.3998+00	.3998+00	-9999.
192000			239	259	-14.9	.2857+00	.3854+00	.3854+00	-9999.
193000			246	248	-15.6	.2747+00	.3715+00	.3715+00	-9999.
194000			255	249	-16.5	.2640+00	.3583+00	.3583+00	-9999.
195000			263	251	-17.3	.2537+00	.3454+00	.3454+00	-9999.
196000			266	255	-17.8	.2437+00	.3325+00	.3325+00	-9999.
197000			264	259	-18.7	.2342+00	.3206+00	.3206+00	-9999.
198000			245	261	-19.5	.2250+00	.3090+00	.3090+00	-9999.
199000			256	264	-20.1	.2161+00	.2975+00	.2975+00	-9999.

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TABLE 5. (Continued)

LAUNCH DATE 620322	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG C)
ALTITUDE (FT)						
20000	249	266	-21.0	.2075+00	.2867+00	-9999.
20100	243	268	-21.8	.1993+00	.2762+00	-9999.
20200	244	269	-22.4	.1914+00	.2659+00	-9999.
20300	248	268	-23.3	.1837+00	.2561+00	-9999.
20400	248	268	-24.3	.1764+00	.2469+00	-9999.
20500	251	267	-25.5	.1693+00	.2361+00	-9999.
20600	256	263	-25.8	.1625+00	.2269+00	-9999.
20700	249	262	-26.5	.1559+00	.2201+00	-9999.
20800	249	263	-26.7	.1496+00	.2114+00	-9999.
20900	251	263	-26.5	.1435+00	.2027+00	-9999.
21000	251	263	-26.5	.1377+00	.1945+00	-9999.
21100	255	263	-27.3	.1321+00	.1872+00	-9999.
21200	263	266	-27.3	.1268+00	.1797+00	-9999.
21300	263	269	-27.5	.1216+00	.1724+00	-9999.
21400	260	272	-27.6	.1167+00	.1656+00	-9999.
21500	261	272	-27.4	.1120+00	.1587+00	-9999.
21600	260	274	-27.8	.1074+00	.1525+00	-9999.
21700	256	276	-28.3	.1030+00	.1465+00	-9999.
21800	253	278	-28.8	.9880-01	.1409+00	-9999.
21900	251	278	-29.8	.9480-01	.1357+00	-9999.
22000	246	278	-31.0	.9090-01	.1308+00	-9999.
22100	239	278	-32.8	.8720-01	.1264+00	-9999.
22200	236	277	-34.4	.8350-01	.1218+00	-9999.
22300	234	275	-35.8	.8000-01	.1174+00	-9999.
22400	229	274	-38.2	.7670-01	.1137+00	-9999.
22500	222	274	-40.8	.7340-01	.1101+00	-9999.
22600	214	276	-43.7	.6950-01	.1055+00	-9999.
22700	200	273	-45.4	.6600-01	.1010+00	-9999.
22800	180	264	-48.0	.6250-01	.9670-01	-9999.
22900	160	259	-52.0	.5900-01	.9294-01	-9999.
23000	133	262	-55.0	.5550-01	.8863-01	-9999.
23100	121	265	-62.2	.5200-01	.8587-01	-9999.
23200	109	268	-63.7	.4870-01	.8101-01	-9999.
23300	097	272	-65.2	.4640-01	.7775-01	-9999.
23400	086	276	-66.8	.4420-01	.7461-01	-9999.
23500	074	279	-68.2	.4210-01	.7154-01	-9999.
23600	064	283	-68.2	.4000-01	.6797-01	-9999.
23700	052	286	-68.3	.3810-01	.6441-01	-9999.
23800	040	289	-69.2	.3620-01	.6182-01	-9999.
23900	027	292	-68.9	.3450-01	.5885-01	-9999.
24000	015	296	-68.2	.3280-01	.5574-01	-9999.
24100	001	321	-67.9	.3120-01	.5295-01	-9999.
24200	011	114	-67.2	.2970-01	.5023-01	-9999.
24300	023	118	-66.2	.2780-01	.4763-01	-9999.
24400	037	120	-66.2	.2700-01	.4544-01	-9999.
24500	050	122	-66.2	.2570-01	.4325-01	-9999.
24600	062	124	-66.2	.2440-01	.4106-01	-9999.
24700	074	126	-67.2	.2330-01	.3940-01	-9999.
24800	094	127	-68.1	.2210-01	.3755-01	-9999.
24900	094	129	-68.2	.2110-01	.3566-01	-9999.

TABLE 5. (Continued)

OFF NUMBER	LAUNCH DATE	TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
3	820322	3							
250000			104	131	-69.2	.2010-01	.3432-01	-9999.	-9999.
251000			114	132	-70.2	.1910-01	.3278-01	-9999.	-9999.
252000			123	134	-71.2	.1820-01	.3139-01	-9999.	-9999.
253000			130	135	-71.7	.1730-01	.2992-01	-9999.	-9999.
254000			136	137	-72.3	.1640-01	.2845-01	-9999.	-9999.
255000			143	139	-73.2	.1560-01	.2717-01	-9999.	-9999.
256000			148	140	-74.3	.1480-01	.2593-01	-9999.	-9999.
257000			153	142	-75.2	.1410-01	.2481-01	-9999.	-9999.
258000			157	144	-76.2	.1340-01	.2370-01	-9999.	-9999.
259000			160	145	-76.9	.1270-01	.2254-01	-9999.	-9999.
260000			151	145	-76.8	.1208-01	.2145-01	-9999.	-9999.
261000			141	145	-76.7	.1150-01	.2041-01	-9999.	-9999.
262000			132	146	-76.6	.1094-01	.1942-01	-9999.	-9999.
263000			123	147	-76.5	.1041-01	.1848-01	-9999.	-9999.
264000			113	147	-76.4	.9908-02	.1758-01	-9999.	-9999.
265000			104	148	-76.3	.9428-02	.1673-01	-9999.	-9999.
266000			095	149	-76.3	.8971-02	.1592-01	-9999.	-9999.
267000			086	150	-76.2	.8536-02	.1515-01	-9999.	-9999.
268000			077	152	-76.1	.8123-02	.1442-01	-9999.	-9999.
269000			068	154	-76.0	.7729-02	.1372-01	-9999.	-9999.
270000			059	157	-75.9	.7355-02	.1305-01	-9999.	-9999.
271000			050	160	-75.8	.6999-02	.1242-01	-9999.	-9999.
272000			041	165	-75.7	.6660-02	.1182-01	-9999.	-9999.
273000			033	173	-75.6	.6337-02	.1125-01	-9999.	-9999.
274000			026	184	-75.6	.6030-02	.1070-01	-9999.	-9999.
275000			030	182	-76.6	.5780-02	.9150-02	-9999.	-9999.
280000			030	179	-77.5	.4440-02	.7890-02	-9999.	-9999.
283000			023	175	-78.3	.3790-02	.6770-02	-9999.	-9999.
286000			016	168	-79.2	.3240-02	.5410-02	-9999.	-9999.
289000			009	151	-80.0	.2770-02	.4990-02	-9999.	-9999.
292000			006	098	-80.8	.2370-02	.4280-02	-9999.	-9999.
295000			009	048	-81.6	.2030-02	.3670-02	-9999.	-9999.
298000			006	000	-83.2	.1630-02	.2970-02	-9999.	-9999.
301000			009	298	-82.3	.1390-02	.2520-02	-9999.	-9999.
304000			017	280	-81.4	.1180-02	.2130-02	-9999.	-9999.
307000			025	274	-80.4	.1010-02	.1810-02	-9999.	-9999.
310000			032	271	-79.5	.8600-03	.1530-02	-9999.	-9999.
313000			036	269	-78.1	.7360-03	.1300-02	-9999.	-9999.
316000			038	269	-76.2	.6320-03	.1100-02	-9999.	-9999.
319000			039	269	-74.2	.5430-03	.9310-03	-9999.	-9999.
322000			040	269	-72.3	.4660-03	.7890-03	-9999.	-9999.
325000			039	268	-70.4	.4000-03	.6690-03	-9999.	-9999.
328000			038	267	-68.4	.3440-03	.5670-03	-9999.	-9999.
331000			039	268	-64.7	.2880-03	.4410-03	-9999.	-9999.
334000			041	267	-60.9	.2580-03	.4080-03	-9999.	-9999.
337000			041	266	-57.2	.2310-03	.3470-03	-9999.	-9999.
340000			040	265	-53.4	.1930-03	.2940-03	-9999.	-9999.
343000			038	263	-49.7	.1670-03	.2500-03	-9999.	-9999.
346000			037	264	-44.2	.1460-03	.2130-03	-9999.	-9999.
349000			036	263	-37.0	.1290-03	.1820-03	-9999.	-9999.

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TABLE 5. (Concluded)

OFT NUMBER		LAUNCH DATE 020322		METEOROLOGICAL DATA TAPE		WIND SPEED		WIND DIRECTION		TEMPERATURE		PRESSURE		DENSITY		DEW POINT	
ALTIMETER		ALTITUDE		(FT/SEC)		(DEG)		(DEG C)		(MILLIBARS)		(GRAM/M3)		(DEG C)		(DEG C)	
352000	038	352000	256	037	256	256	256	-22.6	037	037	037	037	037	037	037	037	037
355000	035	355000	251	035	251	251	251	-15.4	035	035	035	035	035	035	035	035	035
361000	029	361000	255	029	255	255	255	-8.1	029	029	029	029	029	029	029	029	029
364000	028	364000	249	028	249	249	249	1.9	028	028	028	028	028	028	028	028	028
367000	027	367000	241	027	241	241	241	12.0	027	027	027	027	027	027	027	027	027
370000	026	370000	230	026	230	230	230	22.1	026	026	026	026	026	026	026	026	026
373000	025	373000	214	025	214	214	214	32.1	025	025	025	025	025	025	025	025	025
376000	027	376000	193	027	193	193	193	42.2	027	027	027	027	027	027	027	027	027
379000	016	379000	189	016	189	189	189	53.1	016	016	016	016	016	016	016	016	016
382000	018	382000	190	018	190	190	190	64.8	018	018	018	018	018	018	018	018	018
385000	020	385000	191	020	191	191	191	76.9	020	020	020	020	020	020	020	020	020
388000	022	388000	191	022	191	191	191	89.3	022	022	022	022	022	022	022	022	022
391000	024	391000	191	024	191	191	191	102.1	024	024	024	024	024	024	024	024	024
394000	027	394000	192	027	192	192	192	115.1	027	027	027	027	027	027	027	027	027
397000	029	397000	192	029	192	192	192	128.4	029	029	029	029	029	029	029	029	029
400000	032	400000	193	032	193	193	193	141.8	032	032	032	032	032	032	032	032	032

TABLE 6. STS-3 SRB DESCENT-IMPACT SURFACE SHIP OBSERVATIONS

Site: USN Ship, Gen. H.S. Vandenberg						
Location: 30°N Latitude 78°W Longitude						
Date: March 22, 1982						
Time: 1607Z						
Surface Observation:						
Air Temp. °F	Wet-Bulb °F	Dew Pt. °F	Pressure (MSL) mb	Wind Dir.	Wind Sp. Kt.	
75.1	70.3	68	1015.7	260°	12	
Sky Observation:						
Clouds			Total Sky Cover	Total Opaque Sky	Visibility (miles)	
2/10 Cumulus at 2,000 ft 1/10 Stratocumulus at 4,500 ft 3/10 Altocumulus at 10,000 ft			6/10	6/10	7	
Sea Observations:						
Sea Condition:		Wind Waves:		Swell Conditions:		
Sea Slight to Moderate - Code 3-4		Freq. Sec.		Data Not Available		
1/10 Breaking Waves		5				
0/10 Foam		1½				
Surface Sea Water Temp = 24.4°C (75.9°F)						

TABLE 7. SELECTED ATMOSPHERIC OBSERVATIONS FOR THE FLIGHT TESTS OF
THE SPACE SHUTTLE VEHICLES

Vehicle Data					Surface Observations				Inflight Conditions			Count Down and Launch Comments of Meteorological Significance	
Seq. No.	Vehicle No.	Launch Date	Time ^c (EST) Nearest Minute	Launch Pad	Thermodynamic ^a			Wind ^b		Max. Wind Below 60,000 ft			
					Press ^d N/cm ²	Temp. (°C)	Rel. Hum. (%)	Speed (ft/sec)	Dir. (deg)	Aht. (ft)	Speed (ft/sec)		Dir. (deg)
1	STS-1	4/12/81	0700	39A	10.234 ^e	21	82	11.8 15.2	125 120	44,300	98	250	Wind directional change observed at Pad just prior to L+0.5g
2	STS-2	11/12/81	1010	39A	10.166	23	61	27.0 27.0	345 355	36,300	158	286	
3	STS-3	3/22/82	1100	39A	10.160	24	71	7.0 ^f 8.0 ^f	50 ^f 145 ^f	45,000	119	250	

a. Pad 39A thermodynamic measurements taken at approximately 1.2 m (4 ft) above natural grade at camera site No. 3.

b. 1 min average prior to L+0 of 60 ft PLP (listed first) and 275 ft FSS winds measured above natural grade.

c. Eastern Standard Time unless otherwise noted.

d. Pressure measurement applicable to 21 ft above MSL unless otherwise indicated.

e. Pressure measurement applicable to 14 ft above MSL.

f. 10 sec average prior to L+0.

g. Due to onset of sea breeze.

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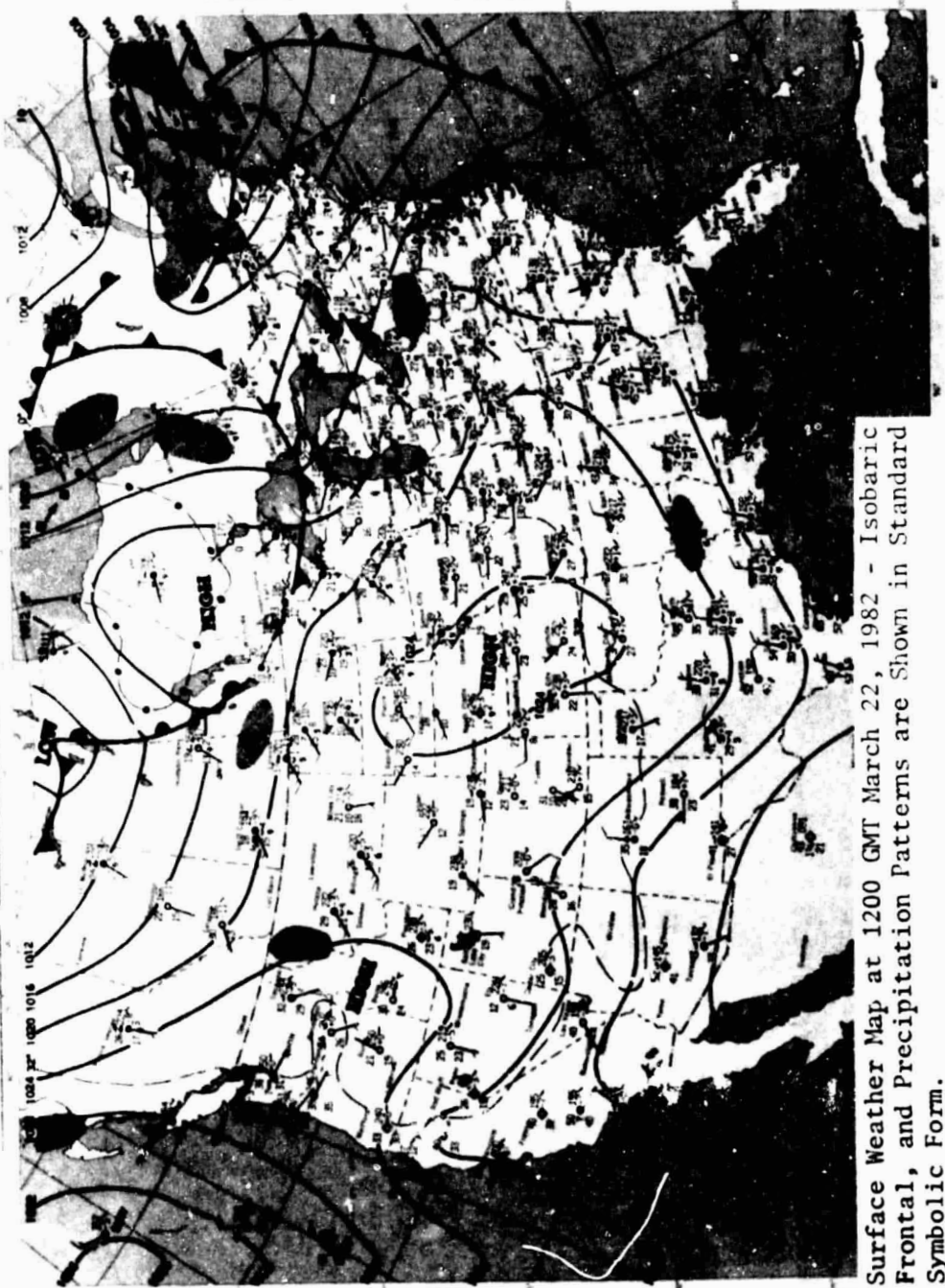


Figure 1. Surface weather map 4 hr prior to launch of STS-3.

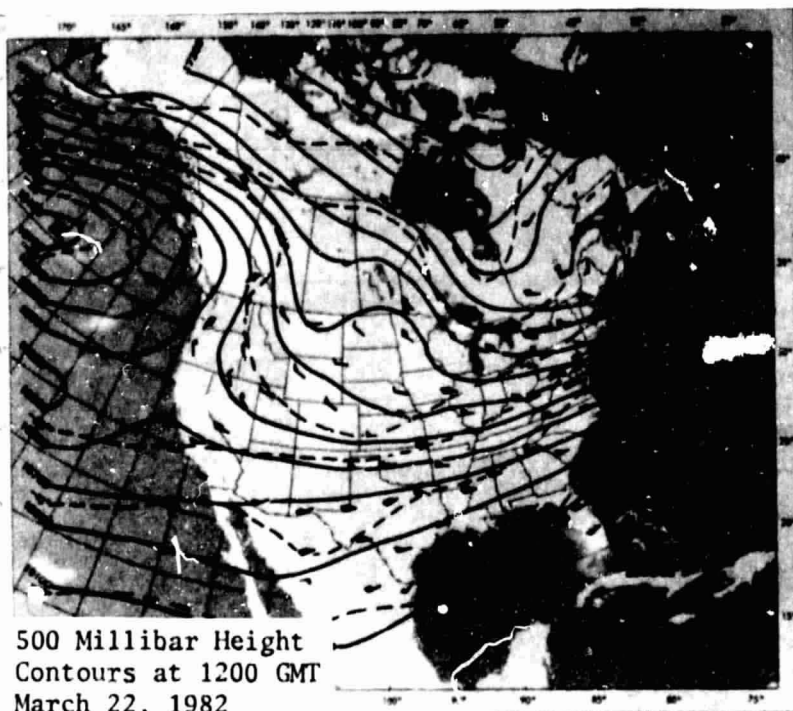


Figure 2. 500 mb map 4 hr prior to launch of STS-3.

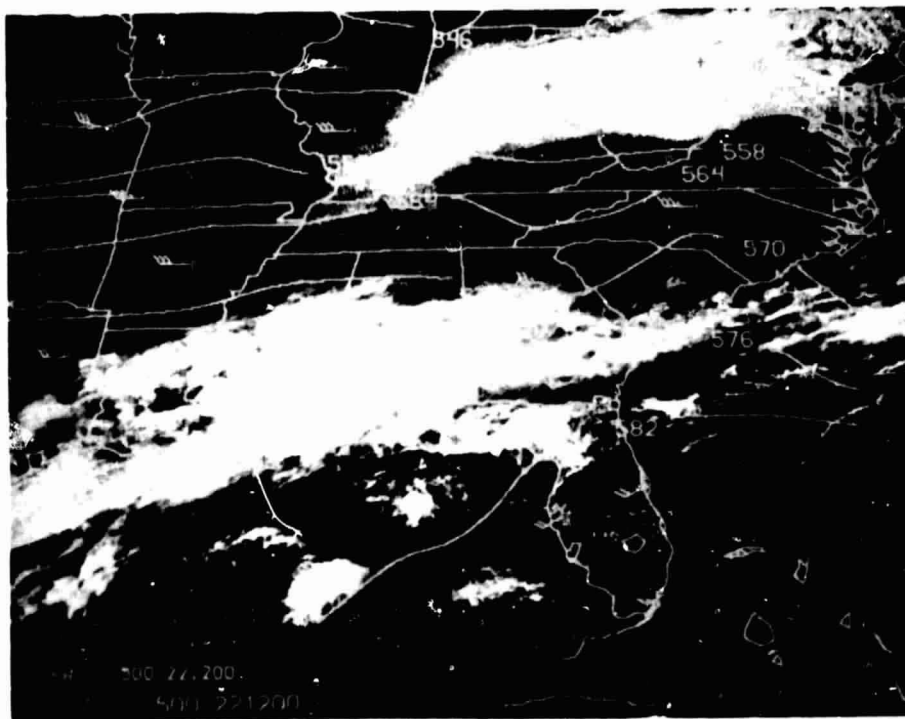


Figure 3. GOES SMS-II visible imagery of cloud cover 1 hr, 30 min after launch of STS-3 (1730Z, 22 March 1982). 500 mb contours and wind barbs are also included for 1200Z.

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Figure 4. Enlarged view of GOES SMS-II visible imagery of cloud cover with exhaust trail visible (indicated by arrow) during launch of STS-3 (160JZ, 22 March 1982).

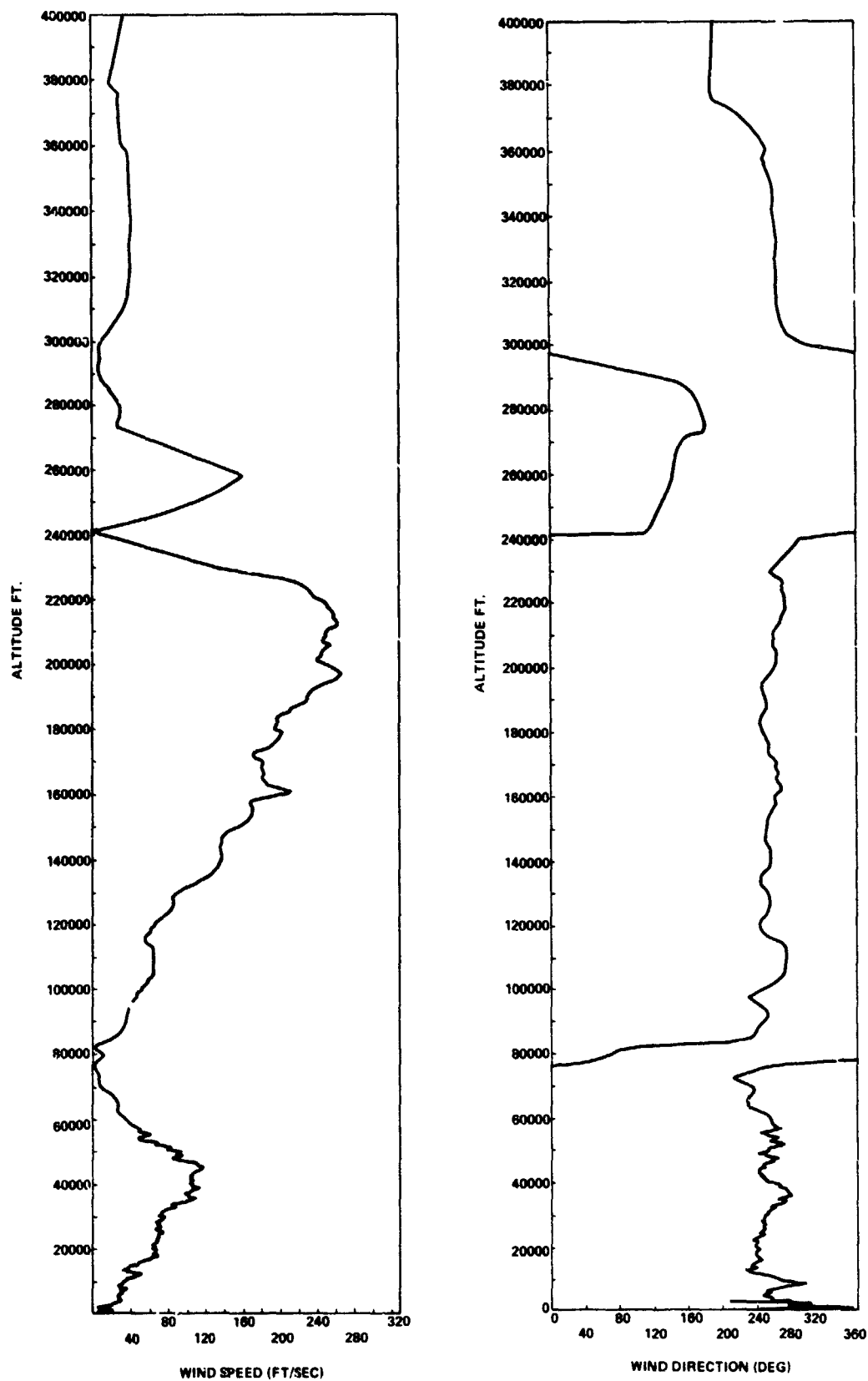


Figure 5. Scalar wind speed and direction at launch time of STS-3.

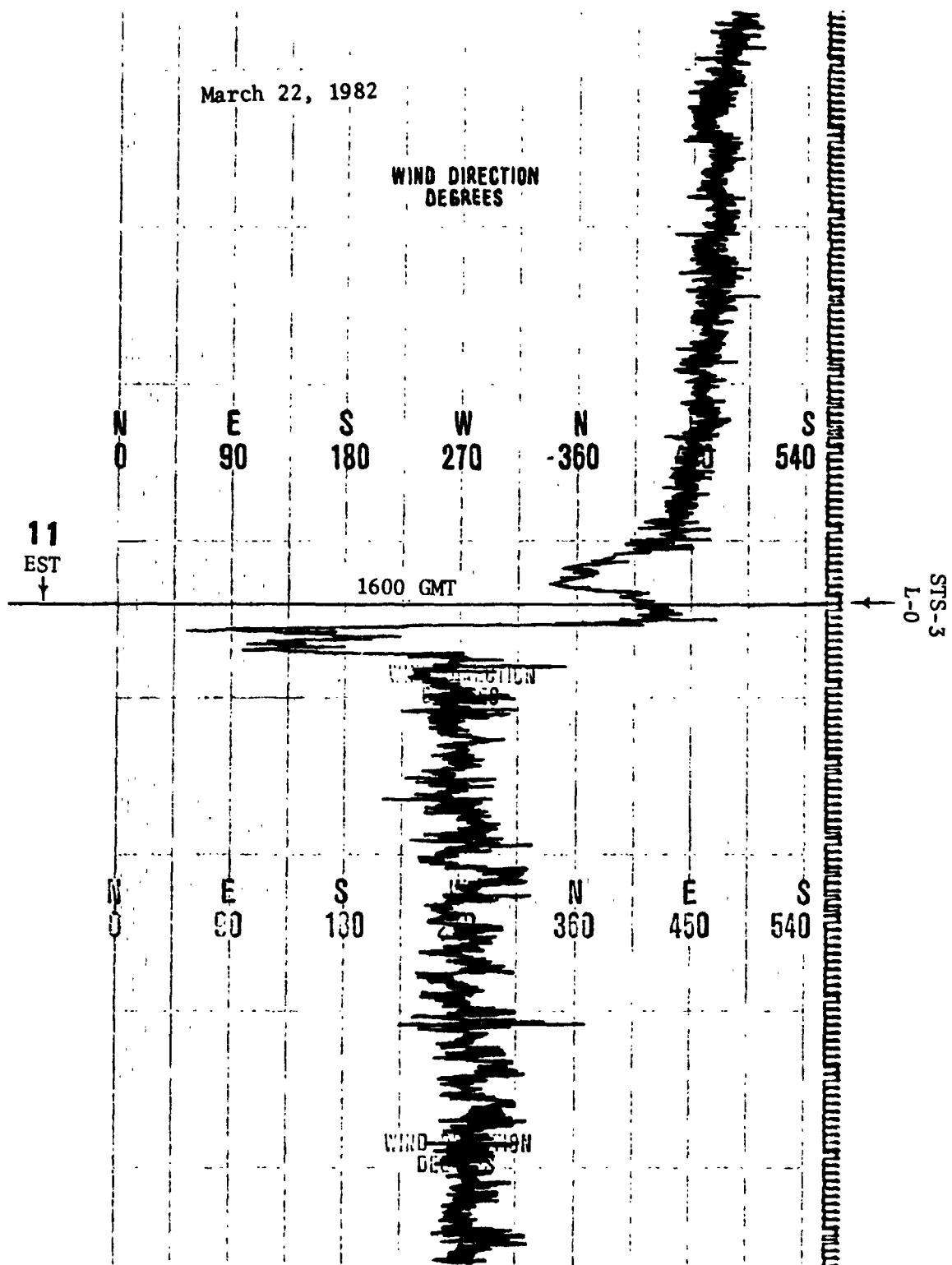


Figure 6. NW 60 ft pad light pole wind directional trace showing sea-breeze establishment starting just prior to STS-3 launch.

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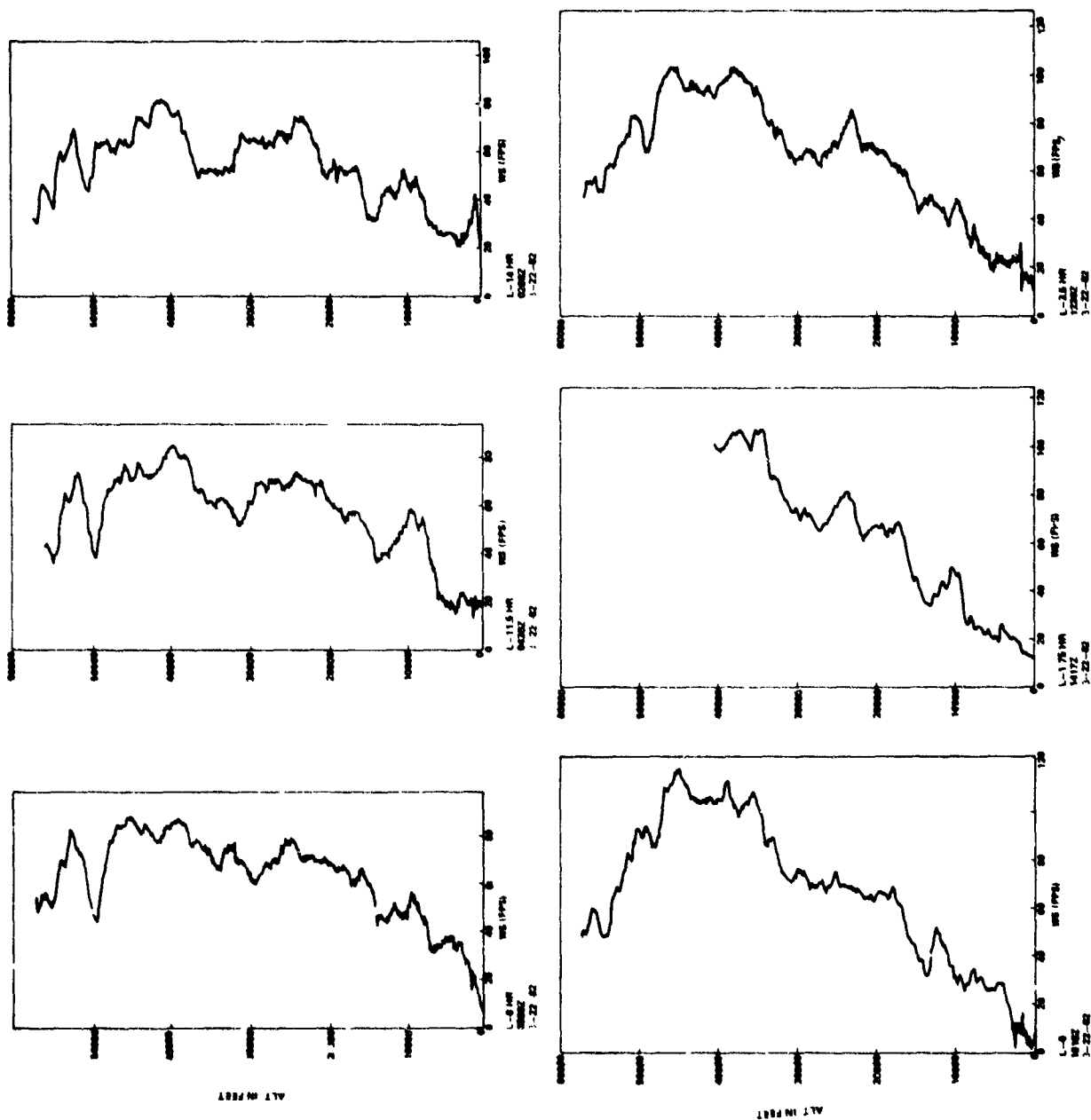


Figure 7. STS-3 prelaunch/launch Jimsphere*-measured wind speeds (FPS).

*L-1.75 hr is an MSS-Windsond.

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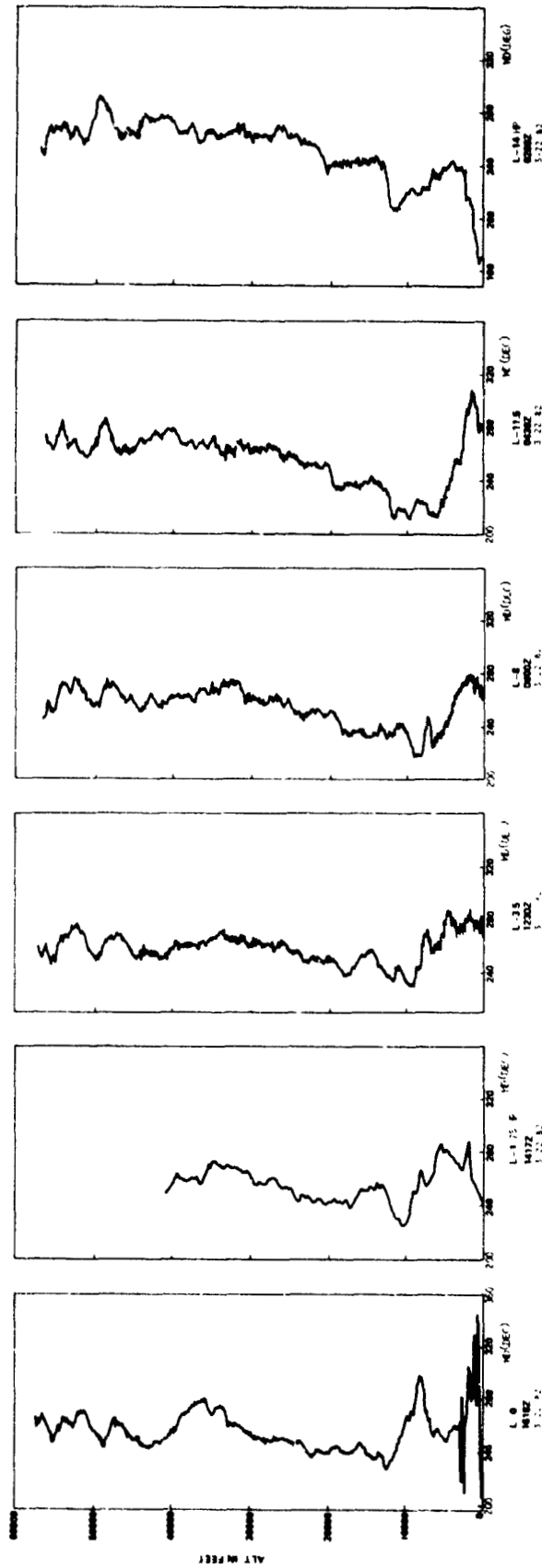


Figure 8. STS-3 prelaunch/launch Jimsphere*-measured
wind directions (degrees).

39 *L-1.75 hr is an MSS-Windsonde.

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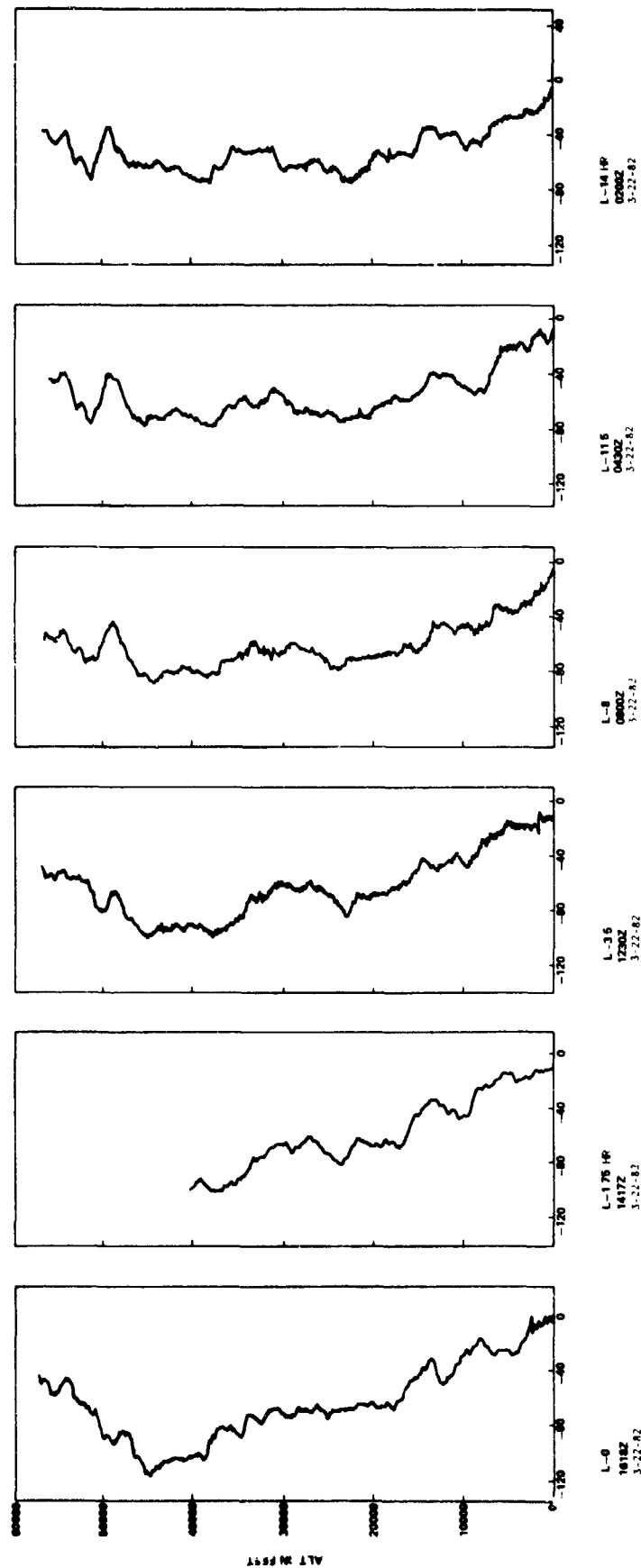


Figure 9. STS-3 prelaunch/launch Jimsphere*-measured in-plane component winds (FPS). Flight azimuth = 60 degrees.

*L-1.75 hr is an MSS-Windsonde.

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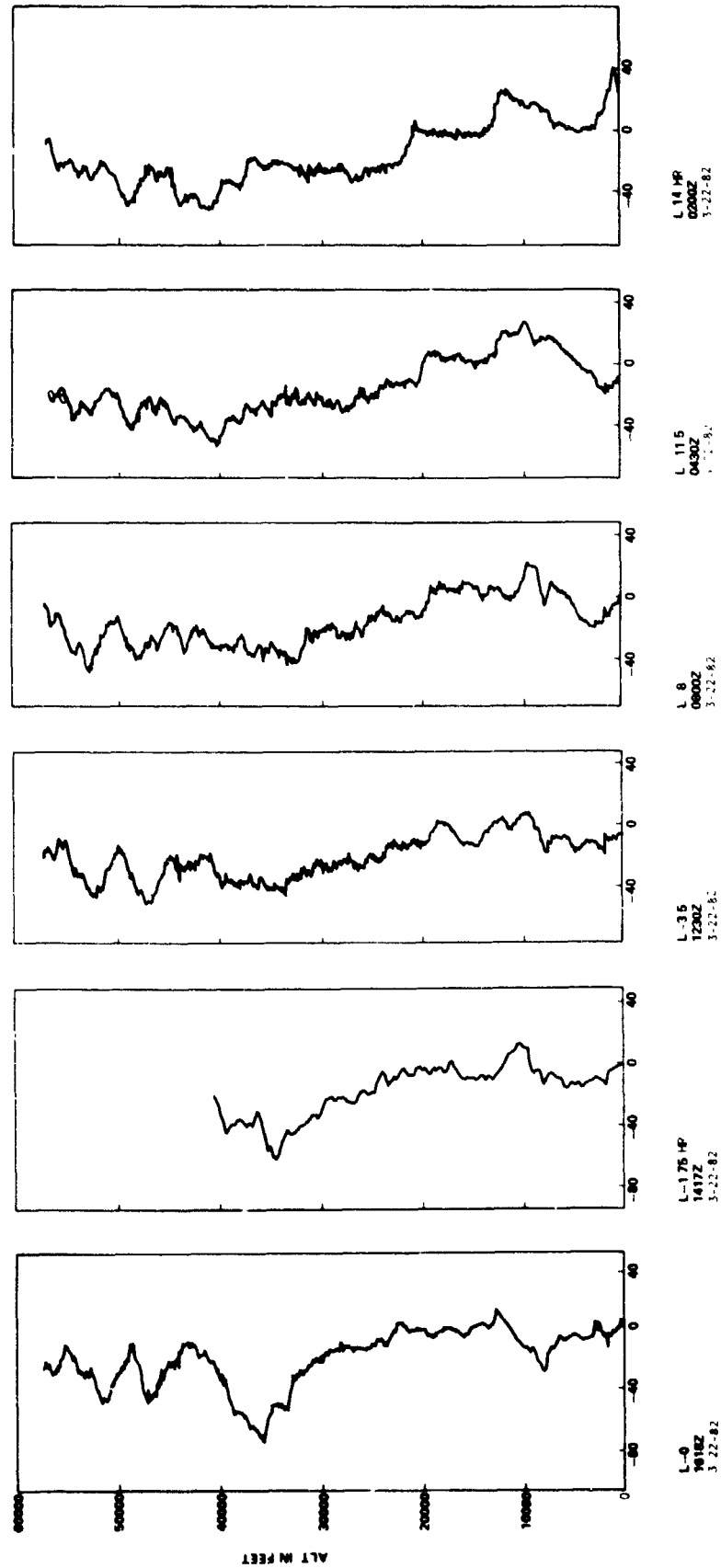
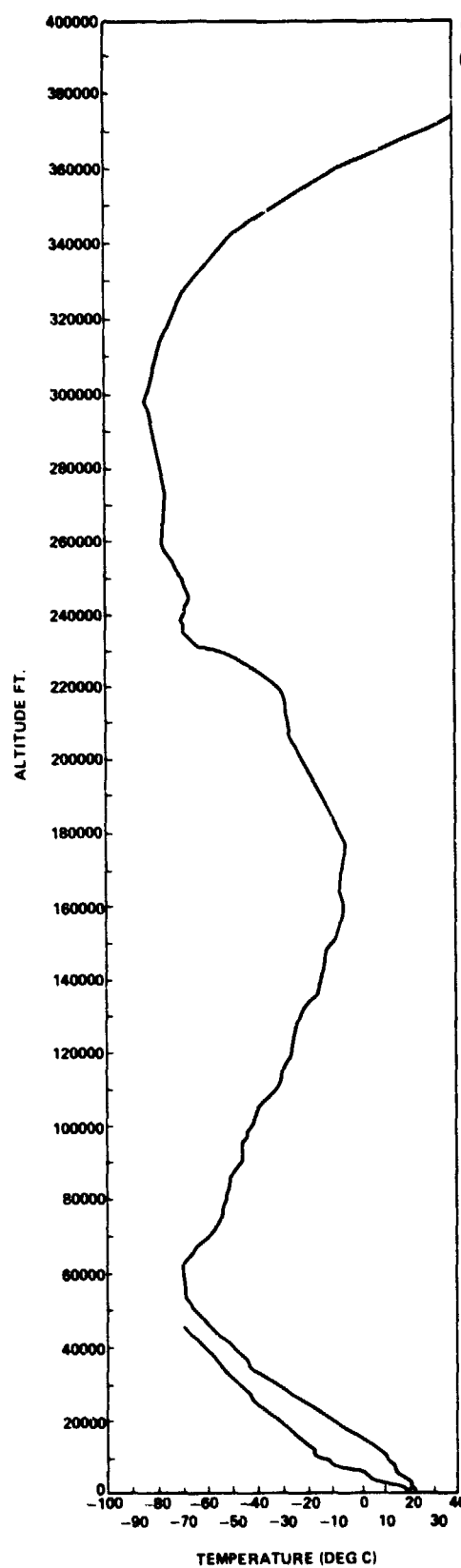
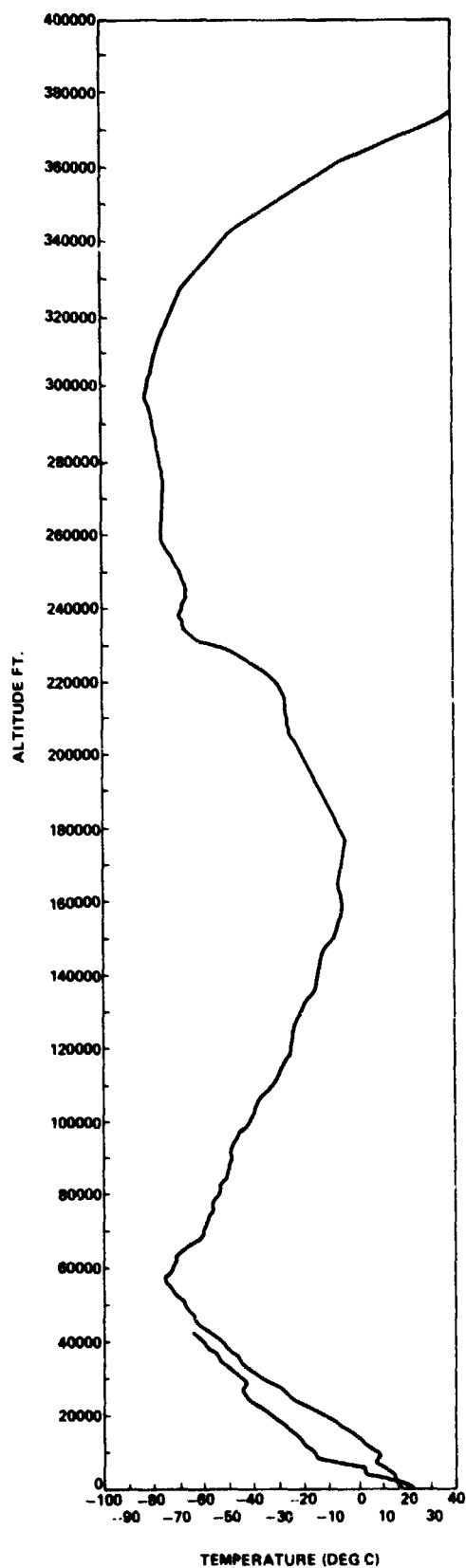


Figure 10. STS-3 prelaunch/launch Jimsphere*-measured out-of-plane component winds (FPS). Flight azimuth = 60 degrees.



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T_D - Dew point temperature

T - Temperature

Figure 11. STS-3 temperature profiles versus altitude for launch (left) and SRB descent (right).

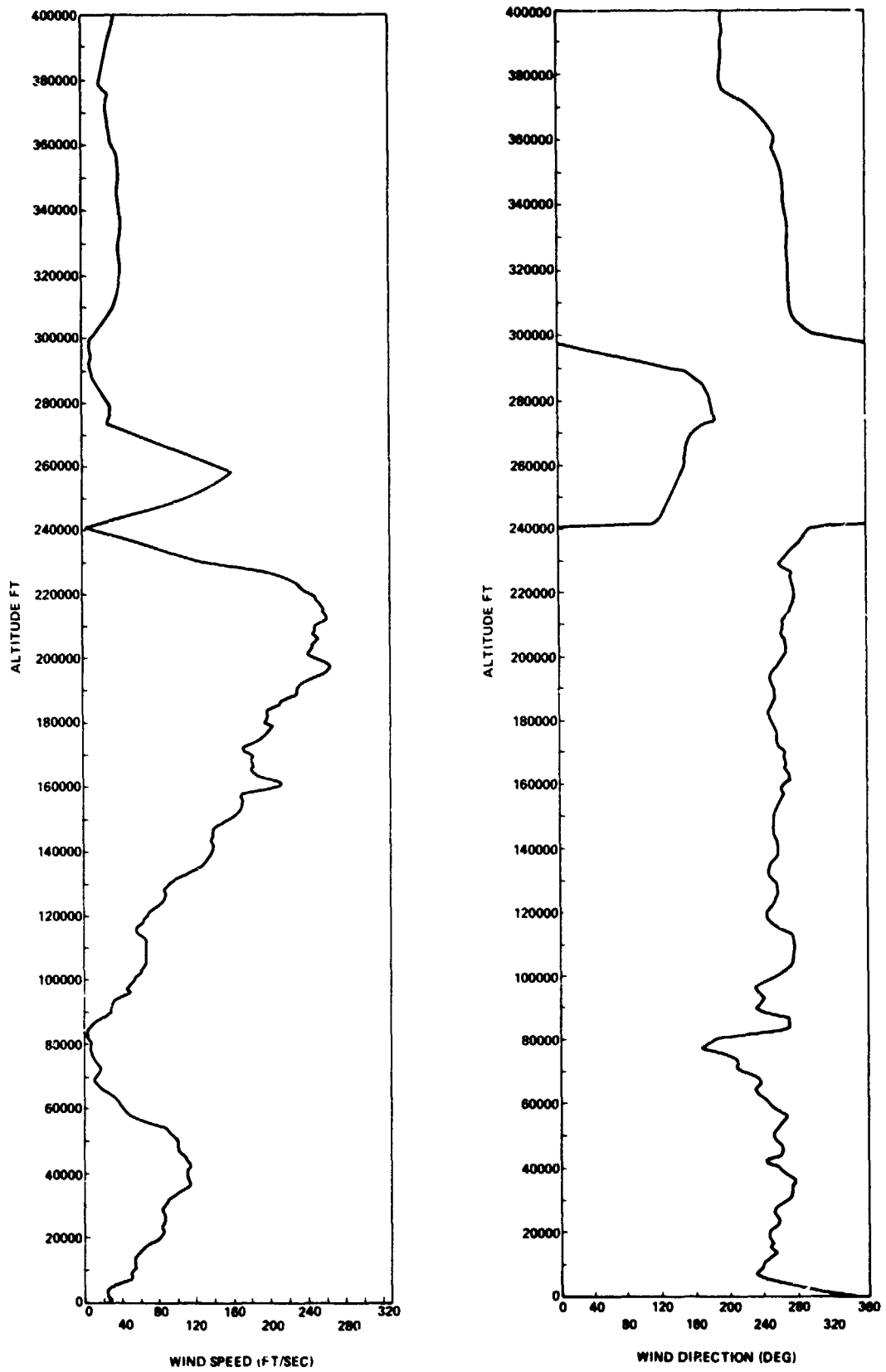


Figure 12. STS-3 scalar wind speed and direction for SRB descent.

REFERENCES

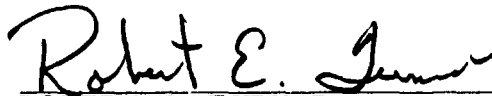
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APPROVAL

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-3) LAUNCH

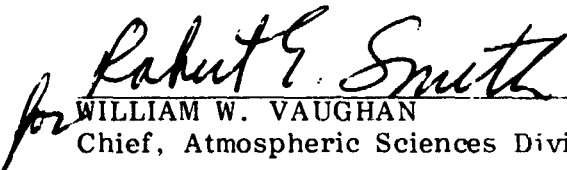
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The information in this report has been reviewed for technical content. Review of any information concerning Department of Defense or nuclear energy activities or programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.



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